DEPARTMENT OF AGRICULTURE.

BULLETIN NO. 17.

DISEASES OF POULTRY

AND THE

Furred and Feathered Enemies

OF

DOMESTIC FOWLS.

BY

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AND

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ILLUSTRATED.

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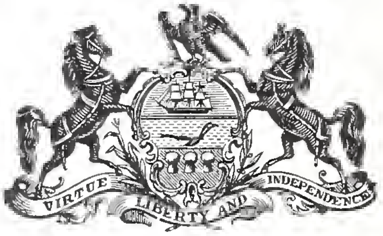
VIRTUE
LIBERTY AND
INDEPENDENCE

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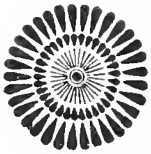


LETTER OF TRANSMITTAL.

DEPARTMENT OF AGRICULTURE.

HARRISBURG, PA., *November 1, 1896.*

HON. THOS. J. EDGE, *Secretary of Agriculture, Harrisburg, Pa.:*

Sir: We have the honor to transmit herewith for publication as Bulletin No. 17, a popular report on the diseases and enemies of poultry. Careful estimates indicate that the poultry industry of this Commonwealth, is depleted by these agencies to the extent of $2,500,000 each year.

The numerous letters of inquiry that have reached us show that there is a wide-spread demand for information on these subjects.

Part 2, chapters 9 and 10 of this volume, entitled "A Preliminary Report Concerning Some Furred and Feathered Enemies of Domestic Fowls," is, with the exception of a few species, based on reports received by the Zoologist from farmers, poultry raisers, sportsmen and naturalists throughout the State. The economic status of the Cooper's and Sharp-shinned Hawks, the Great Horned Owl and the Mink have been investigated under your supervision with particular care, and it is clearly proven that they are highly detrimental. Investigations concerning the economic relations of several other species of our common birds and mammals, which it is popularly supposed are a serious hindrance to successful poultry raising and to the propagation of game, are being instituted by the Zoologist, who expects in the course of a few months to collect sufficient data to enable him to prepare a report, which will show the true life histories of the birds and mammals of which, at the present time, so many diverse opinions are entertained.

Very respectfully,
LEONARD PEARSON,
B. H. WARREN.

PREFACE.

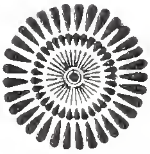
This report on the Diseases and Enemies of Poultry is written in answer to an extensive demand for information on the subjects of which it treats. While a large number of articles on diseases of poultry may be found in poultry journals, live stock papers and poultry books, there has been no recent attempt in this country to produce a comprehensive, popular but accurate description of the diseases of fowls, together with the means to be employed to cure and prevent them.

In preparing the first part of this Bulletin, the Veterinarian has made free use of all of the works on diseases of poultry that he has been able to secure, and has drawn upon the English, French and German literature.

Special acknowledgment must be given to the agricultural and poultry periodicals, to the following authors: Zürn, Friedberger and Fröhner, Neumann, Railliet, Nocard and Leclainche, and the publications of the U. S. Department of Agriculture by Drs. Salmon, Smith, Moore and Stiles.

There is a great deal to learn in reference to these subjects, and a promising field for investigation and research is offered. It is hoped that some of the numerous imperfectly understood diseases of poultry may be carefully studied, and a future more complete report upon this subject issued under the auspices of the State Department of Agriculture.

Chapters 9 and 10 of this Bulletin, prepared by the Zoologist, Dr. B. H. Warren, deal with several species of birds and mammals, which according to reports received by the department commit depredations to poultry which amount annually to fully a quarter of a million dollars.



PART I.

INTRODUCTION.

IMPORTANCE OF THE POULTRY INDUSTRY.

The production of eggs and poultry is one of the most important branches of agriculture. To those who have not given this subject especial attention, the statement that the annual poultry products of the United States are equal in value to the wheat crop, may appear something startling.

According to a recent estimate of the American Agriculturist, based on the last census and on an extensive inquiry, the number of fowls in the United States is about 383,000,000, these produce 1,141,000,000 dozen eggs each year, and the value of both amounts to $343,000,000.00.

Pennsylvania is one of the leading states in the production of poultry. According to the same authority, there are in this State 15,374,000 fowls of all sorts; turkeys, geese, ducks and chickens, valued at $8,236,000, and these produce 68,818,000 dozen eggs each year worth, at 20 cents per dozen, $13,763,600, making a total value for poultry and eggs of about $22,000,000.00.

At a very conservative estimate, one-tenth of the poultry, young and old, is carried away by disease each year. Hence the importance of this subject is manifest.

TREATMENT OF SICK FOWLS.

A number of difficulties are met with in treating fowls that do not confront the veterinarian or live stock owner in treating most of the other domestic animals. Fowls are not accustomed to being handled. They are of a semi-wild disposition, so that when it becomes necessary during illness to examine and administer medicine to them they are apt to resist. However, fowls can be treated as successfully as any other animals, provided they receive the same amount of careful, intelligent attention.

On all farms where poultry is kept in large numbers it is advisable to have a small building or room fitted up as a hospital for the care of sick and disabled birds. If such a place is at hand it will be possible to achieve much better results than when attempts are made to treat fowls in the buildings where their companions are, and where they are constantly annoyed by them, or than can be reached if the fowls are placed in a dirty box in some damp, out of the way place, under the impression that anything is good enough for a sick chicken.

CAUSES OF DISEASE.

The causes of diseases of poultry are various and attention is directed to the cause of each one treated upon in the following pages. It will be noticed that in most cases diseases are avoidable, that they result from mismanagement in the way of feeding, housing or cleanliness. Some of them, however, are contagious and cannot be wholly prevented even when the feeding and sanitary conditions are of the best, but experience teaches that where conditions are good for birds they are bad for disease germs and vice versa, so that when contagious diseases prevail, their ravages are much greater among fowls that are poorly kept than among those that are cared for properly.

Contagious diseases and parasites are usually introduced by new fowls brought into the flock, and it is worth while, especially where pure bred fowls are grown, to place all new acquisitions in quarantine away from the flock for a few days, and until it has been shown that they present no evidence of disease. Great care should be used, also, in purchasing only from sound stock kept under favorable conditions.

SYMPTOMS OF DISEASE.

Birds show disease in a variety of ways, but in most cases if the affection is at all severe, they become listless, sluggish, torpid, inclined to keep away from their fellows, they are apt to stand with the head drawn down, the wings and tail pendant and feathers ruffled. In many diseases, diarrhoea is the first symptom and in all cases of diarrhoea, attention should be paid to the droppings for the purpose of noting their color and whether they contain worms or an admixture of mucus or blood. Sometimes loss of appetite is the first symptom of disease, sometimes paleness of the comb and visible membranes. In the skin diseases, the first symptoms appear on the surface and consist in a loss of gloss on some of the feathers and stiffness and brittleness of the feathers, and sometimes the appearance of naked spots.

The examination of the throat is important in many cases because it is the seat of two common and very serious affections of domestic fowls, namely, roup and gapes. In examining the mouth and throat the bill can be opened by pressing the thumb and finger on the angle at either side, then if the windpipe is pressed upward from the neck, the larynx can be forced into the back of the mouth and examined easily. It is frequently of advantage to have an assistant hold the fowl while the examiner carries out these manipulations and also holds the tongue down by bearing upon it with a wooden tooth pick or some similar small object.

The temperature of the fowl is rarely measured, because fever is shown by symptoms of chilliness, etc., but it is well to know that the normal temperature of the domestic fowls varies between 106 and 107.5 degrees F. This is considerably higher than the temperature of the larger animals. If it becomes desirable to measure the temperature, it can be done by inserting a clinical thermometer into the cloaca. It should penetrate for about two inches and remain two or three minutes before it is withdrawn and read.

The heart beat of the fowl is quite rapid, varying from 110 to 140 per minute, but the determination of its rapidity is of little importance in diagnosing the disease of fowls, because when they are grasped for the purpose of counting the beat, it becomes so rapid that it is sometimes almost impossible to count it, running up in many cases to 300 pulsations per minute. The heart beat can be easily felt by applying the fingers to the sides of the chest wall.

The rapidity of respiration is of more importance than the rapidity of the heart beat, because it can be determined at a distance from the fowl, and without annoying it and thus quickening this function. The normal breathing rate of the fowl at rest is from 50 to 60 respirations per minute. In diseases of the breathing organs and obstructions of them by growths or parasites, the respirations become quickened.

POST MORTEM EXAMINATIONS.

Very often it is not possible to determine the character of a disease affecting fowls until after they are dead, and as many of the poultry diseases are contagious, it is always advisable to *open and examine every fowl that dies in the flock.* This may enable the owner to check a contagious disease in its incipiency and avoid great loss. But in any case, it is advisable to know what fowls die from, so that similar occurrences may be recognized and prevented in the future. The anatomy of the fowl cannot be described at this time for lack of space, but anyone who is in the habit of opening and cleaning chickens, knows the general appearance of the healthy organs, will usually recognize marked departures from the normal.

If fowls die from unknown diseases, and particularly if they die in large numbers from a disease that seems to be contagious, information in regard to these affections may be obtained by correspondence with the State Veterinarian, and it is desired that fowls dying from vague diseases shall be expressed as soon as possible after they are dead to the Veterinary Department of the University of Pennsylvania, Philadelphia. They should be wrapped in cloth and heavy paper, packed in straw, nailed up in a box with a cake of ice and expressed as promptly as possible. A letter should always be forwarded either in the box or by mail explaining the general symptoms and characteristics of the disease. Such shipments may be made C. O. D.

THE MEDICATION OF FOWLS.

The medication of individual fowls is not difficult, but requires care and patience. There are several forms in which medicines may be administered. Pills can be given most readily. It is only necessary to secure the bird, open its bill and drop the pill into the back of the mouth, then close the bill and if the bird resists, hold it together until the pill has been swallowed.

Fluids are sometimes administered from a spoon, but if the fowl is badly frightened this may be a matter of considerable difficulty. The best way is to introduce a small rubber tube, about a third of an inch in diameter, into the mouth, pass it into the oesophagus and down to the crop. A little experience will enable one to do this quickly and without discomfort to the bird. Fluid medicines in any desirable quantity can be introduced through this tube.

Pasty mixtures are sometimes given. Medicines are mixed with sticky materials, as molasses, honey, etc., made into pasty masses and placed in the back of the mouth with a small wooden paddle. Flocks can be treated, when the birds will eat, by mixing medicines with the food or dissolving them in water. Sometimes powders are given by sprinkling them on moist grain. Chalk is frequently given, in this way to birds with diarrhoea by mixing it with rice that has been moistened. It thus adheres to the kernals and is eaten without reluctance.

When a very sick fowl is under treatment, it is better to give small doses at frequent intervals than large doses at long intervals, for in this way the action of the medicine can be measured more accurately and the proper dose can be ascertained by trial. Fowls of different breeds and different sizes and ages require different doses. It is not always possible to determine these accurately, but the judgment of the poultry keeper must be called into play in all instances.

DISINFECTION.

Disinfection is alluded to very frequently in the following pages and is often of the greatest importance. Many poultry keepers are under the impression that it is sufficient to scatter strong smelling powders or liquids about the coops or poultry houses, and that so long as the odor of these materials is in the air, the premises are undergoing disinfection. Nothing could be more misleading or further from the truth. Disinfection is practised for the purpose of destroying disease producing germs and disinfectants, or the materials used for disinfecting, will only destroy germs that they come in contact with. It is perfectly evident that when disinfectants are scattered about carelessly they come in contact with a very small fraction of the entire surfaces that may harbor germs, and unless all of these surfaces are covered and all of the germs reached the disinfection is apt to be fruitless. In order that disinfection may be carried out properly it is essential, first of all, to remove the manure, litter and rubbish of all kinds. This should be mixed with lime and placed in barrels, or it should be spread on fields at such a distance from the poultry runs that it cannot possibly contaminate them. However, if the disease is a virulent one it is always best to burn manure rather than take any chances with it. Then the interior of the building should be thoroughly swabbed or scrubbed out, and afterwards the disinfectants can be employed. Disinfectants are best used in solution because they can then be applied more evenly and perfectly. They can be applied with a brush, with a sprinkling pot or, best of all, with a spray pump, such as is used for spraying fruit trees. The disinfectants to be employed in special cases are mentioned hereafter in connection with the prevention of the different diseases. Whitewash is always a good disinfectant, but its value can be greatly increased for this purpose by adding chloride of lime to it, one pound to three or four gallons, or carbolic acid, one pint to the bucketful.

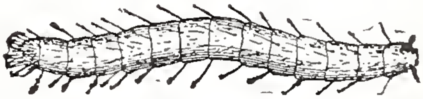
CHAPTER I.

DISEASES OF THE SKIN.

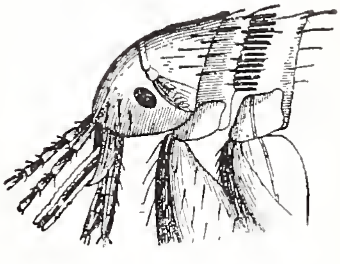
A. *Those caused by parasites.*

1. FLEAS.

The bird flea, known as *Pulexavium* is a very small brownish insect. It has six legs but is without wings. Its body is somewhat elongated and flattened from side to side. This little parasite is exceedingly annoying to poultry and especially to pigeons. It is very active and lives not only on the bird but also on the perches and in the nests and crevices of poultry houses. By its constant biting it keeps fowls awake and causes them to scratch and hop about so that their rest is disturbed and eventually they become thin and weak and if they are not actually killed by the fleas, which occurs very rarely, they are so harrassed that they are predisposed to other diseases and in this way the flea may be an indirect cause of death. Pigeons are annoyed by fleas far more than other poultry.


Larva of the Chicken Flea.
Twenty times natural size.

The remedy is to allow the birds a dusting place and if the parasites are very numerous insect powder or sulphur should be mixed with the dust and when the fowls scratch and burrow in this powder it enters the spaces between the feathers, reaches the skin and so obstructs the breathing openings on the surface of the flea that it finds the conditions very disagreeable and becomes stupefied and falls off or goes away. Or insect powder can be blown by means of a powder gun or blower between the feathers of the afflicted fowl. It is also necessary to so treat the roosting places, nests and poultry houses that the fleas will be either destroyed or driven away. Because if this is not done they return to the birds as soon as the dust is shaken from their feathers. Disinfection can be accomplished by spraying the interior

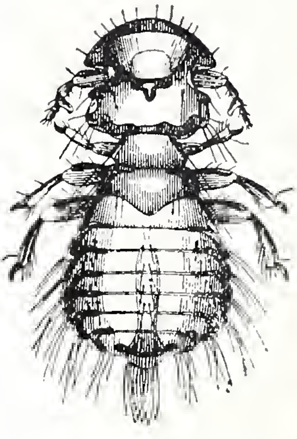

Head of the Chicken Flea.
Thirty times natural size.

of the building with a solution of carbolic acid (one part to twenty parts of water). Or a kerosene emulsion, such as is used for spraying fruit trees, can be employed for the same purpose.

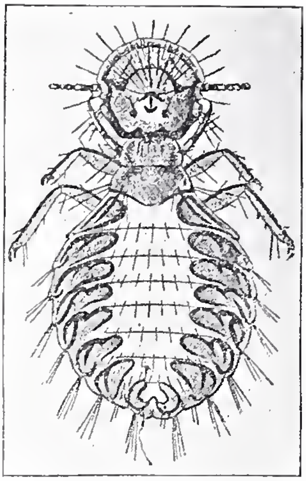
2. LICE.

Bird lice differ considerably from the ordinary lice of haired animals. They do not suck blood as those do and cannot, for they are provided with a mouth that only enables them to bite. They live on the crusts, scales and dead cells that gather on the surface of the skin and that are prevented from falling off by the feathers.

There are several varieties of lice belonging to four principal genera: these are *Goniodes, Goniocotes, Lipeurus* and *Menopon.* While these parasites differ considerably as regards their shape and size they resemble each other very closely in their habits. All of them are very small insects, from 1-100 to 1-6 inch long and their bodies are plainly divided into three parts; the head is very large and flat, the thorax, or second segment, is roundish and considerably smaller than the head; the abdomen, or most posterior segment, is long, oval and plump. Their color is usually grayish or yellowish but some of them show different shades of brown. Although these parasites do not penetrate the skin and suck the blood as fleas do, and as the lice of mammals do, they cause a great deal of itching and annoyance while crawling about over the surface and sometimes they bite the skin and in that way occasion much irritation.


Chicken Louse.
Goniodes dissimilis, male.
One of the most common varieties. 20 times natural size.

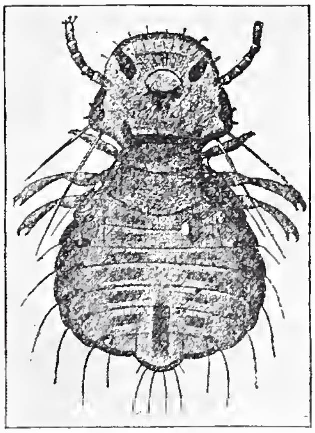
At one time it was thought that lice were bred by filth and that they generated themselves, as it were, in dirty places, but it has been shown that this is not the case and that they are only produced by like parasites and have the property of reproducing themselves with great rapidity. It has been estimated that the third generation springing from a single individual may reach the enormous number of 125,000 within twelve weeks.



Chicken Louse.
Goniocotes gigas, female.
Ten times natural size.

While it is true that neglect, dirt, filth, etc., favor the growth and propagation of lice, it should always be remembered that they cannot appear in the poultry yard unless they are brought in by an infested fowl or by a cage that a fowl has been in or some other object that an infested fowl has been in contact with. But fowls are interchanged so frequently and fowls of different owners come in contact in so many ways at poultry shows, in markets, etc., that it is not at all difficult for a yard that was previously free from these parasites to become infested when least suspected.

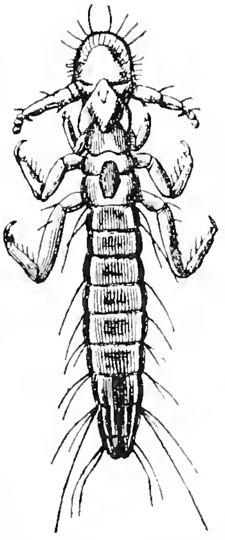
These parasites occasion as much loss as any disease that fowls are subject to. While they alone do not often kill birds, in many cases they so annoy them by their constant irritation that they prevent sleep and rest so that fowls and especially young ones do not grow and thrive as they should and become thin and delicate. In this condition they do not produce eggs nor are they good for food, and so long as they continue to remain badly infested with lice they are absolutely unproductive and worthless.



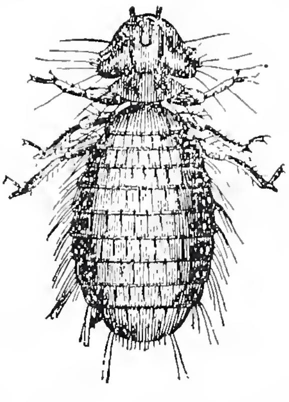
Chicken Louse.
Goniocotes hologaster, male.
Forty times natural size.

The conditions that are most favorable to the propagation of lice have already been mentioned briefly. Attention should also be called to the fact that poultry houses that are dark and damp furnish very favorable places for the growth of these insects. Then, also, fowls that are poor in condition are more apt to be infested with lice than those that are in good condition, healthy and sturdy. It has been noticed frequently that where there are a number of fowls in an infested pen those that are least rugged harbor the most lice. The probable reason for this is that fowls in poor condition have a somewhat dry and scurfy skin which provides more hiding places and more food for lice than the smooth, pliable skin of the perfectly healthy bird. When fowls are afflicted in this way it can be noticed that they are uneasy and restless, they are constantly pecking at different parts of the body and scratching and shaking themselves. They also have an inclination to dust themselves and when caught and examined the lice can frequently be seen, when the feathers are spread apart, and especially about the head and neck, where they cannot be reached by the bill of the animal, beneath the wings and sometimes on all parts of the body. They may also be found in many cases, if a careful search is made, in the nests, on the perches and in cracks and out-of-the-way places at any point in the building.

In attempting to destroy lice it is necessary not only to treat the fowl but also the premises occupied by it, because if we simply destroy those that are on the bird they will return again from the surroundings just as fleas do. In treating an animal for the purpose of destroying lice two methods may be employed. We may use substances that will poison the lice outright or we may use substances that are not poisonous in themselves but which destroy lice by obstructing the pores on the surface of the insect and thus shutting off its supply of air and suffocating it. The latter plan is preferable in the case of young and weak birds. Little chickens but a few days old frequently acquire lice from their mothers or their surroundings and are sometimes annoyed seriously by them. In these cases it is advisable to apply a small quantity of bland oil, such as sweet oil or cottonseed oil, to the chicken's head and perhaps to the sides of the neck if the parasites are very numerous, or lard may be used for the same purpose. In the case of older fowls sulphur ointment is a very efficient remedy. It should be applied in small quantity about the head, sides of the neck, beneath the wings and around the vent. Or insect powder (*pyrethrum*) may be blown between the feathers and this will destroy or drive away the lice. If the fowl is to be liberated immediately after the powder is applied it is well to first dampen the feathers so that it will not be at once shaken off. A dust bath should always be provided and this goes a very long way toward keeping fowls free from all sorts of skin parasites. It is frequently advisable to add insect powder or sulphur to the dust.



THE LONG CHICKEN LOUSE.
Lipeurus variabilis,
Male.



THE PALE CHICKEN LOUSE.
Menopon pallidum, female.
Probably the most common variety. 20 times natural size.

Neumann records a case where a farmer took the plaster from a building that was being torn down and threw it into the road so that it might be thoroughly pulverized by passing wagons. This powdered plaster was thrown into a poultry house infested with lice and a dust bath was made of it, with the result that the lice disappeared completely within a short time.

Another plan for removing lice is to place the body of the fowl in a box provided with an opening through which the head can project. The box is then filled with sulphur fumes which destroy the lice very quickly. A wash of very weak carbolic acid solution or of weak creolin solution has also been recommended for this purpose. but it is not well to dampen the fowl if it can be avoided because they are so very prone to take cold.

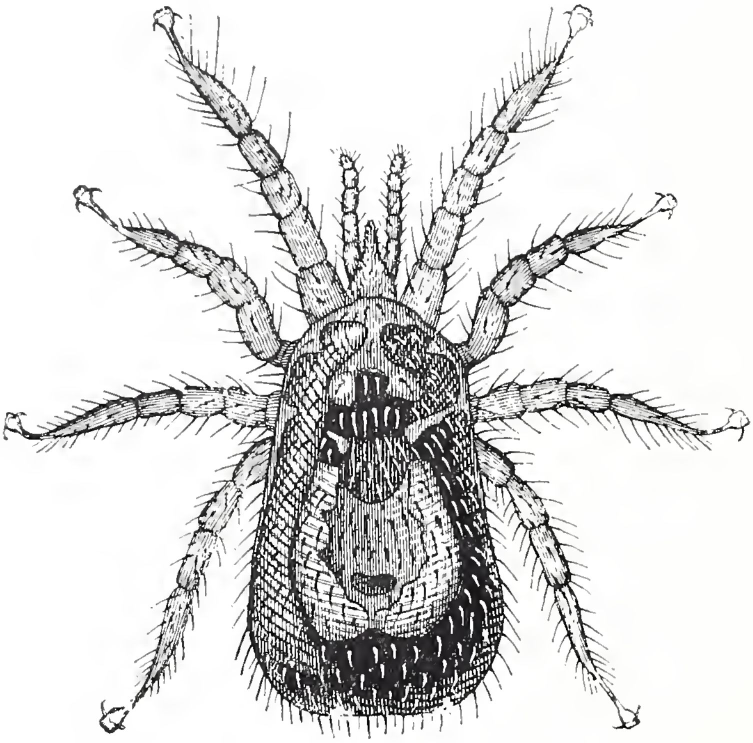
The destruction of the lice in the poultry house necessitates the thorough cleansing of the building. The movable fixtures should be removed, the walls should be thoroughly swabbed or washed down, the floor should be scraped and scrubbed and then the entire interior should be whitewashed with a whitewash to which chloride of lime (one pound to four gallons) has been added. Or prior to the whitewashing the interior of the building may be sprayed with a solution of carbolic acid (one part to twenty of water) or fumigated by burning sulphur after all of the cracks and crevices have been carefully closed. Kerosene emulsion is also highly efficient as a spray for the interior of an infested poultry house. The perches and nests should be scrubbed with a strong solution of washing soda or lye or scalded with hot water. If this treatment is carried out and if the poultry house is whitewashed two or three times a year there will be little trouble in keeping the fowls free from lice.

3. MITES AND TICKS.

These parasites are usually. though improperly. described as lice. They are exceedingly annoying to all kinds of poultry and sometimes cause such loss of condition that lice are suspected but none can be found.

THE COMMON POULTRY MITE, the *Dermanyssus gallinæ*, is a small, oblong parasite. about 1-32 of an inch long and 1-70 of an inch broad. It is provided with eight legs and each foot has two claws.

The abdomen is surrounded by short bristles. The color is yellowish or brownish, but when the animal is full of blood it becomes dark brown or dull red. The back sometimes shows little white

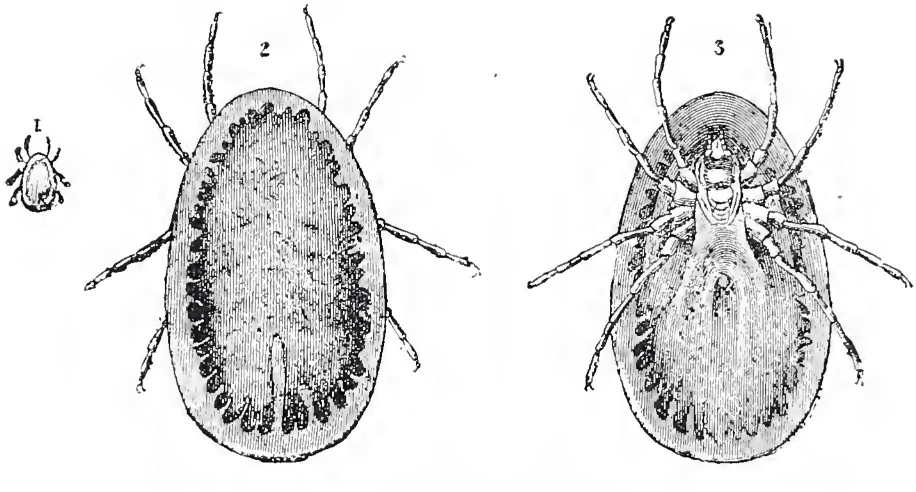


THE RED POULTRY MITE.
Dermanyssus gallinæ— Female—80 times natural size.

spots. This parasite is one of the most destructive known. It affects all varieties of domestic fowls and sometimes when present in large numbers passes to other animals, cattle, dogs, cats, horses and sometimes to people. One of the striking peculiarities in regard to it is that it does most of its work at night. Upon the approach of day it leaves its victim and retires to a dark, secluded spot. A space beneath the end of the perch or under the nest or between the cracks of the floor or walls may sometimes contain a large number of these parasites, both male and female, together with a quantity of eggs and young. They multiply so rapidly that after a few have been introduced into the poultry house it may become over run within a few weeks. This mite is very resistant and difficult to destroy. Some of them have been preserved alive without food for more than a year.

In contradistinction to the habit of the bird lice, this parasite sucks the blood of its victim and one of them may remove quite an appreciable quantity. It is especially hard on young chickens and turkeys and on setting hens. In the former case, by preventing rest at night and by removing blood from the weak and growing bird, it produces weakness and sometimes death. In the latter case, by constantly disturbing the setting hen during the night when she should have perfect rest the annoyance may be so great that she will be impelled to leave the nest and allow the eggs to become chilled or in her endeavor to relieve herself of the parasites, the eggs may be broken. The remedies to be employed to destroy these parasites are similar to those employed for destroying bird lice. But in this case the disinfection and cleansing of the surroundings are of even greater importance. Special pains should be employed to introduce whatever disinfecting solution is used into all cracks and spaces where these parasites might lodge. Carbolic acid solution (1 to 20) is especially valuable for this purpose, and if a good treatment of the building with it is followed by the application of whitewash the insects can be thoroughly eradicated.

THE BIRD TICK (*Argas marginatus*) is in some respects similar to the parasite above described. It is confined to pigeons. It is of an oval shape, of a brownish color, and its head is located beneath the body. It sucks the blood from its victim and sometimes occurs in such large numbers that it destroys pigeons in two weeks, producing death from exhaustion. It is found most frequently about the neck and beneath the breast, but it may also appear on other parts of the body. Sometimes it passes to those who have to handle infested pigeons, and in these cases it may cause by its bite a very painful itching spot that will remain sore for several days. When these parasites are found adherent to the skin of the pigeon, they should be covered with oil or with benzine. This enables one to pull them off without leaving the head in the skin. If the head is broken off a sore place results. The cleansing and disinfection of the pigeon



THE PIGEON TICK—*Argas marginatus*, Female.
1. Natural size. 2. Magnified, seen on upper surface. 3. Same, seen on lower surface.

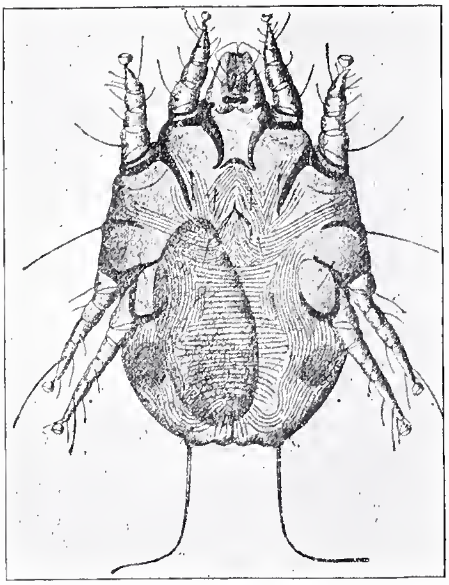
house is of the greatest importance and should be carried out in the most thorough manner. The interior should be thoroughly scraped and scrubbed and then fumigated or sprayed and whitewashed.

4. MANGE.

Mange of birds is of two kinds: That affecting the feathered parts of the body and that affecting the legs and feet. Of the first kind there are two principal varieties, which have such prominent characteristics that they can usually be distinguished without difficulty. Mange of the legs and feet is considered on page 57, in connection with the diseases of the legs and feet. Fortunately, mange of poultry is not common in this country, but as we are constantly importing fowls of all descriptions from all parts of the world, and constantly interchanging them, the disease may be introduced into any locality at any time, and it is therefore important that it should be understood so that its ravages may be checked before extensive injury has been occasioned.

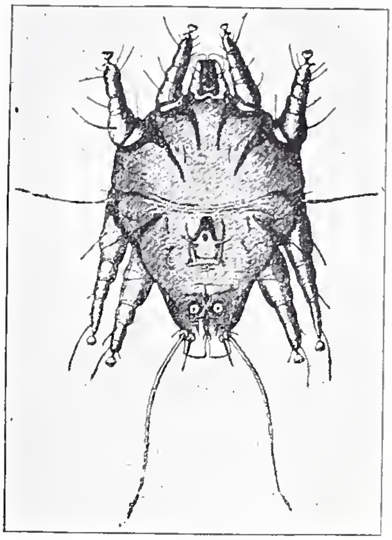
MANGE OF THE BODY.

The first variety of body mange is caused by an exceedingly small parasite known as *Epidermopes bilobatus*.. The first indication of this disease is the appearance of a bare spot about the neck or on the head. The feathers become dry and brittle and either break off or fall out. Then the skin becomes covered with yellowish scales which gradually increase in thickness as the disease advances until they sometimes reach a thickness of an eighth of an inch. When old, these scales are grayish and have the appearance of thick scabs. If they are pulled off it is found that the skin beneath is red and bleeds easily. As a rule these areas do not itch, but sometimes they do, and then the bird scratches them vigorously. After becoming established about the head and neck the disease may spread to the body and sometimes covers a very large surface. The symptoms of this affection resem-



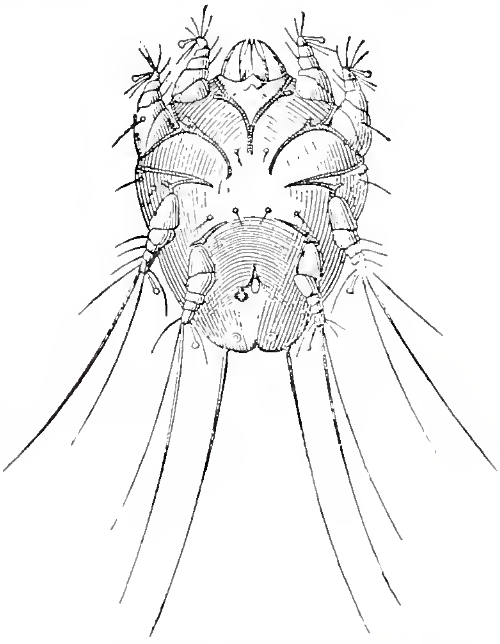
THE PARASITE OF ONE FORM OF BODY—MANGE OF FOWLS.
Epidermoptes bilobatus, Female--150 times actual size.

ble those of favus so closely that it has been thought by some that the disease is in fact produced by a vegetable parasite, but as yet this has not been proven.



The Parasite of One Form of Body—Mange of Fowls.
Epidermoptes bilobatus, male—150 times actual size.

The other variety of body mange is caused by a parasite known as *Sarcoptes lœvis* Of late years it has been common in Europe, and has prevailed especially during the spring and summer. It may begin on any part of the body and usually spreads until the entire skin is affected. When it has reached this stage the whole body is bare and the only feathers that remain are a few in the tail and some in the wings. The skin is healthy in appearance, with the exception that it is devoid of covering. It is smooth, flexible and normal in color. There is no itching and the general health of the fowl is usually good, although sometimes after having been afflicted for a long time it may become thin and gradually waste away. When feathers are pulled out on the border of the diseased area it is noticed that the lower end of the sheath is covered with scaly layers and the parasite can usually be discovered among them.



The Parasite of One Form of Body—Mange of Fowls.
Sarcoptes lævis, male—200 times natural size.

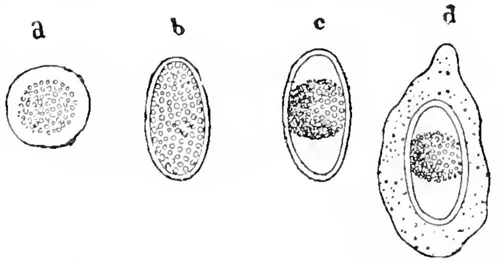
Schaeffer has recently reported a case where this disease appeared among a flock of 70 hens and nearly all of them lost all of their feathers, with the exception of those in the wings and tail. The parasite could easily be found by pulling out a feather and examining its base. These fowls had been kept in dirty pens and were also afflicted with mange of the legs. The pens were re-arranged and cleaned and the fowls were sprinkled twice a week with a weak solution of creolin poured on to them from a watering pot, with the result that in about four months they had recovered and feathered out again.

The treatment to be employed in these cases is first of all to isolate the afflicted fowls. Then disinfect the premises that they have occupied, and afterward give them individual treatment if they are worth it. The local treatment consists in the application to the diseased skin of remedies that will destroy the parasite producing the disease. One of the best applications for this purpose is a solution of balsam of Peru in alcohol (1 part to 5). This can be applied with a sponge or soft brush, and should reach not only the diseased area but the healthy skin for a distance of about an inch on all sides. Another efficient application is sulphur ointment, or a solution of creolin (1 part to 50) may be used, but should be applied lightly and not rubbed in, because if applied too freely or energetically it may poison the fowl.

5. PROTOZOA.

Barnyard fowls, turkeys, and especially pigeons, are sometimes attacked by a peculiar wart-like growth that appears about the head, the base of the beak, the eyelids and the orifices of the nose, and sometimes spreads to the base of the wings and the general surface of the body. These growths are yellow and smooth and resemble the warts that frequently appear on the hands. They are contagious, spreading from one bird to another, usually slowly, but sometimes with considerable rapidity, and are caused by a minute animal parasite belonging to the *Protozoa.*

That these growths are contagious has been frequently proven by experimentation. One of them can be removed and a small portion of it rubbed over the scarified skin of a healthy fowl. Within eight or ten days the surface will show a perceptible elevation at the point of inoculation, and a few days later the new warty growth will be plainly developed. These warts are not destructive to the pigeon unless they are very numerous, or occur so plentifully about the eyes and nose as to obstruct these openings, or spread from the corners of the beak into the mouth. If they are numerous in these localities they cause serious



PROTOZOA, FROM A FOWLS INTESTINE.
Coccidium perforans,

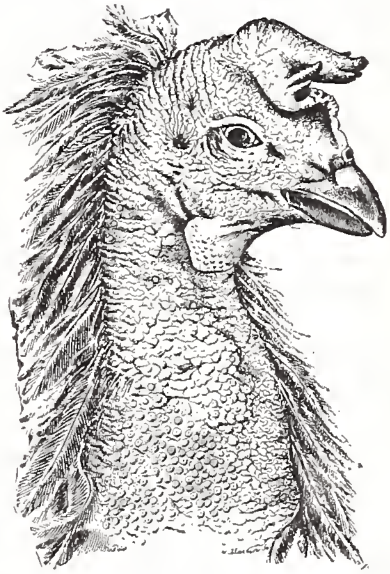
a. b. coccidia extracted from the epithelial cells of the intestine, and representing the first phases of development; c. encysted coccidium, found free in the intestine; d. adult coccidium encysted in an enlarged and deformed epithelial cell.

inconvenience, the bird becomes thin and weak and finally dies. The English poulterers sometimes refer to this disease as a pox of the chicken but this designation is very misleading because fowls do not suffer from pox in the sense that mammals do.

The remedy for these warts is to remove all infected birds from the pigeon loft, renew the nests, clean the interior and treat the individual by burning the wart out with a hot iron or apply tincture of iodine or turpentine. Creolin is also efficient, but it is necessary that the top of the growth should be sliced off before the creolin is applied, then by placing a drop on the end of the wart and renewing the application every three or four days as long as necessary, the condition may be permanently cured. Tincture of iodine constitutes by far the best remedy.

6. FAVUS.

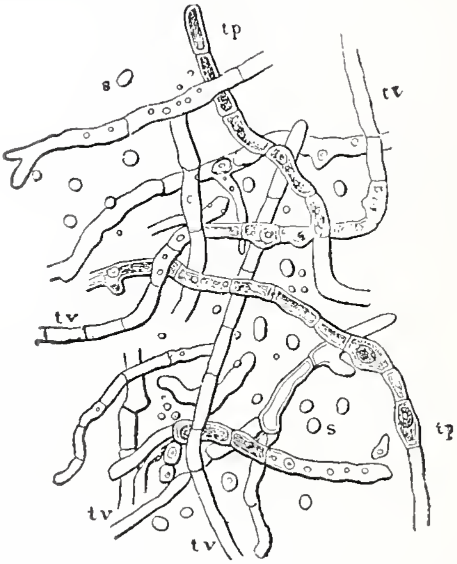
In some respects this disease resembles mange. It is, however, produced by an entirely different parasite, and on close examination it can be seen that the condition of the skin is different from that which exists in mange. The parasite of favus is a vegetable growth, known as *Achorion schonleinii.*



HEAD AND NECK OF A FOWL AFFECTED WITH GENERALIZED FAVUS.

Favus usually commences about the comb, head and neck. It causes the feathers to become brittle and break off and fall out, and when these are examined closely it is seen that their interior is filled with scales and with branching threads resembling minute roots. These are the filaments of the vegetable parasite or fungus. When the comb is involved, it becomes swollen, its surface becomes scaly, whitish and powdery. The eyelids are frequently affected, and in some rare cases the feathered surfaces are involved to such an extent that the bird becomes almost naked. Upon the skin there develops a thick yellowish or grayish crust or scab in the form of rather small, roundish disks, depressed at the center. The odor of the diseased bird is peculiar and disagreeable and resembles that of a mouldy or musty grain bin. It becomes thin, weak, exhausted, and unless relieved it dies.

If a small portion of a crust or the contents of a feather growing on the diseased skin is moistened with a weak solution of acetic acid and placed under the microscope it will be seen that it is made up of cells from the skin among which thread-like branching filaments penetrate in all directions. There are also numerous little round bodies which are the spores or seeds of the parasitic plants. Favus is contagious and spreads from one animal to another. It is more apt to affect animals that are in poor health and weak than those which are hearty and strong. It is also more apt to start at a point where the skin is broken than where it is intact. There are numerous observations on record which seem to indicate that favus may be communicated from fowls to man and it is important therefore that birds in this condition should be handled very carefully.



THE *Achorion Schonlein* OF THE FAVUS OF POULTRY.

Eight hundred times natural size; tv, empty tubes; tp, tubes containing protoplasm and spores; s, isolated spores.

The diseased fowls should in all cases be removed from the flock as soon as this malady is recognized. Then they may be treated by applying oil or glycerine to soften the scab, and when this has been removed an application of creolin (1 part to water 30 parts), or carbolic acid (1 part to water 100 parts), should be used, or the surface may be painted with tincture of iodine, or an ointment composed of benzine, 1 part, and soft soap, 20 parts, may be applied and thoroughly rubbed in.

B. *Those not caused by parasites.*

1. IRRITATION OF THE SKIN.

It sometimes happens that when fowls are exposed to cold rains or to draughts while they are wet or to an accidental application of irritant drugs, such as carbolic acid, kerosene or similar substances, sometimes used for the purpose of killing lice, that the skin becomes irritated and red. The redness may continue for several days and some feathers may drop out from the affected parts. This condition is not very serious, and can easily be remedied by applying mild ointments such as the oxide of zinc ointment or cosmoline. The removal of the cause is usually sufficient to effect a cure.

2. INFLAMMATION OF THE SKIN.

The causes of the previous affection when unusually severe, or when they continue to act for a considerable time, produce not only the mild condition above described, but also an inflammation of the skin that is more or less intense. A similar condition may result from the accumulation of filth around the posterior portion of the body. In cold weather these accumulations alternately thaw and freeze and pull upon the feathers they are attached to, thus leading to an inflammation of the adjacent skin that can be recognized by redness, swelling, tenderness to pressure and discharge from the surface.

The remedy consists in cleansing the skin by the use of soap and water, cutting off the feathers if necessary, and then applying the ointments above mentioned.

3. DISTURBED MOULTING.

During the spring while fowls are shedding their feathers they are in a delicate condition and are more apt to become diseased upon exposure to deleterious influences than at any other time. Their tenderness and loss of vitality is shown by the fact that they lose their spirits and activity to some extent. Their appetites are somewhat capricious, and the production of eggs falls off very greatly. If the loss of condition at this time is unusually great, or if the fowl is poorly nourished or weakened from any cause, moulting is retarded and the old feathers remain in the plumage, giving the fowl an unkempt, faded, weather-beaten appearance. This result is frequently dependent upon improper feeding at this critical time.

To achieve the best results, fowls must *always* be fed carefully and their rations should be as nearly balanced as possible. During the moulting season especial care is necessary, and the food should be more nitrogenous than at other times. Unless fowls have the material in them and in their food for the production of new feathers the old ones will not be shed. In order that unusually nutritious food may be thoroughly digested it is necessary that the fowls should have free exercise in the open air, but they should also be protected from bad weather, from cold rains and when delicate should be housed early in the evening. A diet containing meat, either raw or cooked, and bones, is appropriate for moulting fowls, and it is also well to give some stimulating food, such as chopped onions or garlic, or a small quantity of pepper. Some of the English poulterers recommend stale bread soaked in ale for valuable fowls during the moulting season, and the Douglas mixture is also in high repute among them. This mixture is made by dissolving 1 oz. of sulphuric acid and half a pound of sulphate of iron in two gallons of water. One or two tablespoonfuls of this solution are placed in each pint of the drinking water, and the effect is that of a gentle tonic. One should always pay particular attention to the cleanliness of the poultry house during the moulting season, because if lice or mites are present then they will do more harm than at other times.

4. OBSTRUCTION OF THE RUMP GLAND.

There is a gland at the point of the rump that secretes an oily substance that tends to keep the feathers in this region oily and sleek. This gland is the largest of the superficial glands of the body and sometimes the orifice through which it discharges its secretion becomes obstructed. Then the region of the gland swells and becomes painful. It may swell to such an extent that it reaches the size of a walnut. This causes considerable pain, the afflicted fowl becomes sluggish and generally indisposed and when it is caught and examined the local swelling can be readily discovered.

If the gland cannot be emptied by gentle pressure a small incision should be made into it with a sharp knife and its contents removed. If, however, the condition has existed for a long time, the gland may fill with a thick, cheesy-like material that cannot be squeezed out. It then becomes necessary to make a somewhat larger opening and scoop the substance out with the handle of a small spoon or some similar object. Then the cavity should be washed out by injecting into it a very weak solution of carbolic acid (1 part of carbolic acid to 200 of water), or a solution of boracic acid (15 grs. to the ounce). To prevent the parts from becoming hard while healing an application of oil or cosmoline should be made.

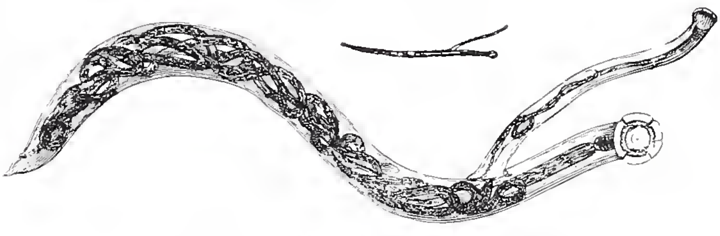
CHAPTER II.

DISEASES OF THE BREATHING ORGANS.

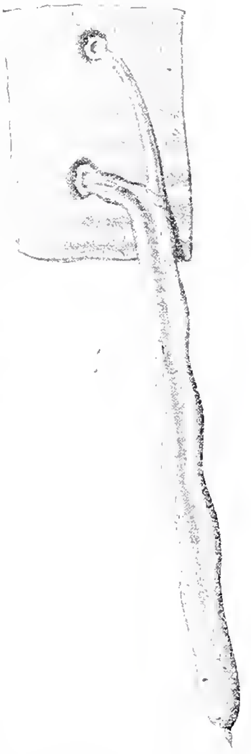
A *Those caused by parasites:*

1. GAPES.

Gapes undoubtedly destroys more young chickens than any other disease. It is a disease caused by a small worm that occupies the upper air passages. This worm was first discovered near Baltimore by Wiesenthal in 1799. Since then it has been described by numerous zoologists and is at present found in all parts of this country and Europe. All of the domestic fowls are attacked by it and some of the semi-wild birds. In Europe it causes great loss among the pheasants. The worm is known as *Syngamous trachealis*, is of a reddish color and the female is about one-half to three-fourths of an inch long, while the male is about one-fifth of an inch long. The male is constantly attached to the female; the funnel-shaped lower end surrounding a pore on the side of the female a little less than one-third of the distance from its head. On account of this peculiar union a gape-worm is sometimes described as a "branch-worm" and on account of its color it is in some places known as the "red-worm." The head is broad and flat and arranged for sucking. This disc-like head



Gape Worm.—*Syngamus trachealis.*
Natural size and five times natural size.

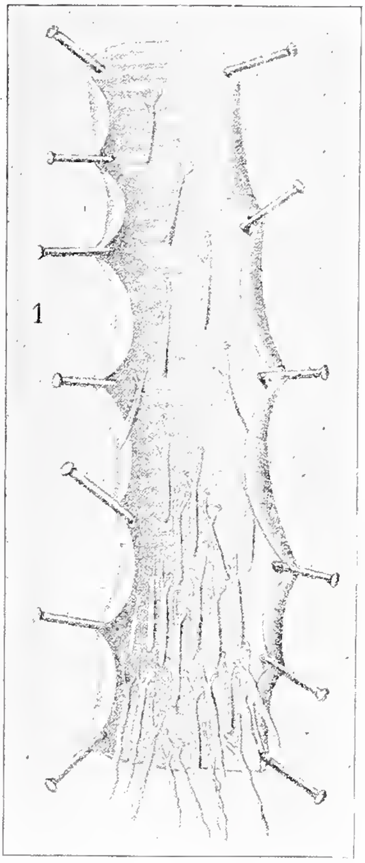


A PAIR OF GAPE WORMS ATTACHED TO A SECTION OF WIND PIPE.

is placed against the lining membrane of the windpipe at any point between the mouth and the bronchial tubes. Sometimes there are as many as 30 or 40 worms in a single fowl, but usually not so many. Three or four of them suffice to destroy a young chick but a greater number are necessary to destroy an adult.

When the worms are coughed out other fowls eat them greedily and in this way they become infected in turn, because the mature females are full of eggs. It has been shown by experiment that after birds are fed upon worms containing eggs they may develop gapes within two to three weeks. Another and perhaps the principal way in which the disease is spread is through the agency of earth-worms. Many of the eggs of the gape-worm when thrown out on the ground gain access to the interior of the earth-worm, then when the earth-worm is eaten by a chicken young gape-worms develop from these eggs and the chicken becomes diseased. Some of the gape-worms are partially coughed up and then swallowed by the fowl; the eggs in them pass through the digestive tract and are voided with the faeces so that in this way, also, the soil of the barn-yard or the water may become contaminated.

The symptoms of gapes are very easy to recognize. The afflicted fowl has difficulty in breathing, it opens its mouth frequently and gaps, or gasps for breath. This manner of opening the mouth is the characteristic from which the disease derives its name. There is some coughing accompanied by the expulsion of frothy slime. Sometimes the mature worms are coughed out. The afflicted bird loses its spirits, it stands about with the feathers ruffled and head down, at intervals opening its mouth as though gasping for air. If there is any doubt as to the nature of the disease an examination of the throat should be made. This is done by catching the bird and holding the mouth open by pressing with the thumb and finger on each side of the beak. This forces the mouth open and exposes the throat. Then by introducing a small object to depress the tongue the larynx may be exposed and the interior examined. Pressure upon the larynx from below will force it up into plainer view. Death results in some cases quickly, from suffocation, and in other cases slowly, from exhaustion and secondary diseases. When this disease appears in a flock, the afflicted fowls should at once be removed in order to prevent the distribution of the parasite. The worms can frequently be removed from the wind pipe by introducing a loop made by doubling a horse-hair. This when introduced and turned around dislodges the worms and draws them out. Or, a feather from which all of the barbs have been removed with the exception of those at the point may be used for the same purpose. Some recommend a timothy head from which the seeds have been removed by rolling between the hands or by shaking, but this is so large that it is difficult to use it except in mature fowls. For chickens, the projections on the lower part of the timothy head may be removed and only those on the tip allowed to remain. This appliance has the advantage over the horse-hair and feather that its sharp spines or hooks are more likely to adhere to the worm and permit its removal. Sometimes oil or turpentine are applied to these various instruments before they are introduced into the windpipe. It is advised in some cases to cause the diseased fowls to inhale the smoke of tobacco. This is done by placing them in a closed box and blowing smoke into it from a pipe. The worms are in this way stupified but unless care is used the fowls will also be stupified and perhaps suffocated. However, the fowl can stand more tobacco smoke than the worm, so that after its release from the box it usually coughs up the weakened parasites. Powdered lime is also used for removing the gape worm by dusting it in such a way that the fowl is caused to inhale some of the fine particles. Sometimes the fowls are placed in a box over which a sheet of muslin is spread and lime is sifted through this muslin top and the fowl is obliged to inhale the dust. This procedure is somewhat dangerous unless great care is exercised, and cannot be very highly recommended.



THE WIND PIPE OF A PHEASANT, CUT OPEN LONGITUDINALLY, SHOWING GAPE WORMS ATTACHED TO ITS INTERIOR.

In the way of internal treatment, camphor, asafoetida and garlic are all of value. Camphor should be given in pills of about one grain each. Asafoetida should be given in one grain pills and garlic should be chopped in fine pieces and fed with the food.

The treatment of the soil over which the infected fowls roamed is of great importance and especially if they were kept in confined spaces. By treating the soil with lime and spading or ploughing it up frequently the eggs of the gape-worm may be destroyed. Or the ground may be thoroughly soaked with a solution of sulphuric acid (one part to one hundred). The water troughs and feeding places should all be thoroughly cleansed and disinfected with coperas solution (one pound to two gallons of water). The bodies of the dead fowls should be buried deeply at a distance from the barn-yard, or burned.

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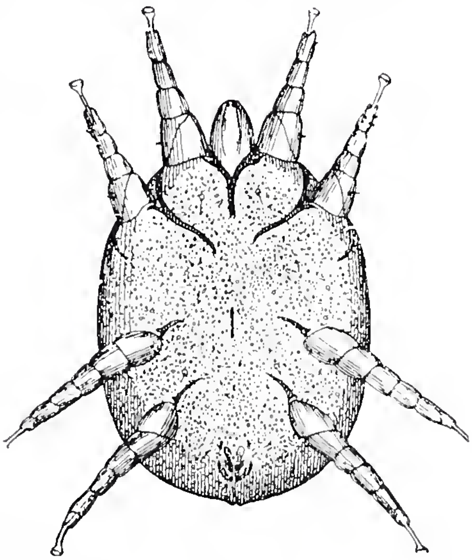
2. DISEASES OF THE AIR PASSAGES CAUSED BY MITES.

There is a minute parasite similar to the parasite of mange that infests the air passages and specially the windpipe, the bronchial tubes and the large air spaces in the chest. It is known as *Cytodties nudus*. Sometimes these parasites penetrate beyond the air sacs and reach the air spaces in the bones. When present in large numbers, they cause an inflammation of the parts they infest, but when present in small numbers they seem to produce no disturbance. The disease produced by them in the bronchial tubes is of the nature of a bronchitis of a severe type and sometimes there is inflammation of the lungs, or pneumonia, as well. These conditions are indicated by difficult and rapid breathing and, Zürn says, by a peculiar tone that is similar to that produced by fowls when a foreign body enters the windpipe. Otherwise the birds seem lively and have a fairly good appetite. It is only when these parasites are present in enormous numbers that the disease they produce is sufficiently severe as to cause death.



THE AIR-SAC MITE OF FOWLS.
(*Cytodites nudus*, one hundred times natural size.

The treatment of these cases is not at all satisfactory, so that it is cheaper in the end to destroy the afflicted fowls than to attempt to cure them. Upon opening a bird that has died of this disease the parasites can be seen in great abundance in the parts mentioned.

If treatment is attempted the inhalation of the vapor of tar or of burning sulphur is as promising as anything.

3. PNEUMONIA CAUSED BY MOULDS.

Several varieties of the common moulds that grow so plentifully in dark, damp places have been known to enter the air passages of fowls, penetrate to the lungs and grow there, causing a fatal pneumonia. The moulds that have been discovered in this locality are of three varieties of *Aspergillus* and one of *Mucor*. It is probable that they enter the lungs in the form of dust, because their spores are exceedingly small and could readily pass into the lungs in this way. Then, if they find the conditions there favorable to their growth they multiply and cause little spots of disease wherever they grow. Sometimes they spread out over the lining membrane of the air tubes and cause a diffuse inflammation and thickening that somewhat resembles the change that takes place in diphtheria. In the lungs, the growths are characterized by the appearance of little round nodules, where the tissue dies and becomes yellowish and of the consistency of cheese. In old cases, these spots sometimes become loaded with lime salts and then they are hard and even stony. The principal symptom is difficult breathing. The respiratory movements are rapid and accompanied by a hoarse sound. The appettite is diminished, the spirits are depressed, the bird is disinclined to move, its feathers become ruffled, it loses flesh rather rapidly and towards the end develops a diarrhoea that hastens it to its fatal termination. The entire course of the disease is rather long and usually covers several weeks.

Treatment in these cases is not to be recommended because the outlook for recovery is poor. However, if anything is done the best results can be obtained by causing the bird to inhale the vapor of iodine. This plan of treatment is carried out by mixing equal parts of tincture of iodine and hot water. The steam as it rises carries the iodine vapor and by holding the vessel beneath the bird's head it is obliged to inhale this medicine. Iodide of potash may be administered internally in doses of one to two grains twice daily.

It is far better, however, to prevent the disease than to allow it to develop and then attempt to cure it. When it is remembered that moulds occur principally in damp, dark places, it will be seen that good drainage, ventilation and light will prevent their growth and thus ward off the disease. Disinfection and whitewashing are also of the highest value in this direction.

B. *Those not caused by parasites.*

1. CATARRH OF THE NASAL PASSAGES. "PIP."

All sorts of fowls, and especially the young, take cold easily when exposed in damp places. An earth floor in the poultry house, particularly if it is poorly drained, is a fruitful source of colds. Poorly constructed buildings with cracks in the walls or broken window panes, permitting a draught to blow through and strike the fowls while roosting at night is a common cause of cold.

Cold are recognized by the well-known symptoms of discharge from the nose, sometimes also from the mouth, swelling of the eyelids, depression of spirits, shown by disinclination to move about actively, marked loss of appetite, inclination to stand in a warm, bright place, with the head drawn down and feathers ruffled, and, if the fowl is a laying hen, cessation of egg production. Since the nasal passage is stopped up the fowl breaths more or less through the mouth, and this may lead to dryness and hardening of the tip of the tongue. This condition is often described by poulterers as "pip," and especially when young chickens are affected.

The treatment is simple and consists first of all in bettering the conditions to which the fowls are subjected, and thus removing the cause of the disease. Holes in the roof and sides of the buildings should be patched, broken window panes replaced, and if it not possible to keep the floor of the poultry house dry at all times it should be removed to another location. The fowl should be placed in a warm, dry coop, where the sun can shine in freely, supplied with small quantities of tempting food and clean water in clean vessels, to which may be added a small amount of chlorate of potash (15 grs. to the pint). A little onion or garlic in the food is also of advantage. If the discharge from the nose collects about the orifices and obstructs them, or if the eyelids are swelled to such an extent that they cannot be opened, the collection of matter should be removed by means of a sponge or soft cloth moistened with warm water.

2. LARYNGITIS AND BRONCHITIS. SORE THROAT.

If the cold is of an especially severe type, on account of the fact that the exposure to which the fowl was subjected was intense or of long standing, or if the fowl is young or of a naturally weak constitution, the membranes of the air passage may become afflicted with catarrh that reaches beyond the head into the throat, and into the branching bronchial tubes that penetrate the lungs. In these cases, the discharge from the nose is more profuse, the depression of the fowl's spirits is greater, there is considerable difficulty in breathing, and in severe cases the bird may gasp for breath very much as though its windpipe were obstructed by gape worms.

The general treatment in these cases is the same as for pip, but more attention should be devoted to the fowl because it is in a more serious condition. In place of chlorate of potash in the drinking water it is better in these severe cases to add small quantities of baking soda (bicarbonate of soda) and Glauber's salt (1 drachm to each pint). It is also of advantage to give small doses of sal ammoniac (1 grain) mixed with honey.

Since roup, a very contagious disease of fowls, commences in a similar way, it is very important to immediately remove from the flock all birds showing the symptoms described above, because if it should prove that they were afflicted with roup the extension of the disease might in this way be prevented.

3. LUNG FEVER OR PNEUMONIA.

If the exposure to which a fowl is subjected is of an unusually severe character, it may result that the bird will develop inflammation of the lungs or pneumonia. Symptoms of this very severe affection are at first similar to those of the two preceding diseases, but they rapidly become worse, and within a short time the patient evinces great difficulty in breathing. It loses all ambition and sense of fear, remains stubbornly in one place and when caught and examined it will be noticed that the muscles in the lower part of the body, those of the abdomen, contract and expand with each respiration and in this way assist the muscles of the chest to expel and renew the air in the diseased lungs. Pressure on the sides of the bird will cause considerable pain. If the fowl dies, and unfortunately most of them do when afflicted with pneumonia, it will be found that the lungs are very red and full of blood, and portions of them when cut off and placed in a vessel of water will sink instead of floating as pieces of healthy or slightly diseased lungs do. The air tubes are filled with a yellowish or reddish frothy fluid which in some cases is expelled in small quantities during life.

The treatment of these cases is not profitable, because so few of them recover. If, however, one wishes to treat an especially valuable fowl, and will consent to devote the time and care to the case that it requires, good results may follow.

Half a teaspoonful of whiskey in a little warm water, together with from 2 to 3 grains of saltpetre and ammonium carbonate may be administered at intervals of from three to four hours. It is also well to cause the fowl to inhale fumes of burning sulphur, but this vapor should not be administered in a concentrated form. The fowl must be kept in a warm, dry place.

CHAPTER III.

DISEASES OF THE DIGESTIVE ORGANS.

A.—*Those caused by parasites.*

There are a great many parasites that infest the digestive organs of fowls. Some of these are of but little moment, because they occur in small numbers and do but little harm; while others are of the greatest consequence because they are sometimes exceedingly numerous and seriously affect the health of the afflicted bird or cause death. The number of parasites that sometimes infest fowls without producing appreciable effects is almost incredible; while in other cases a much smaller number of parasites of the same species may not only cause great inconvenience but may destroy the life of the infested bird. So it is evident that the effects of parasites depend not only upon the number and activity of the parasites themselves, but also upon the strength and resisting powers of the bird affected.

Usually, the number of fowls in a flock that harbor parasites of the same kind is considerable. So that when one of a flock is killed by parasites, and the cause of death is disclosed by a dissection of the bird, it is fair to assume that other fowls that present the symptoms shown by the dead one, suffer from the presence of the same kind of parasite.

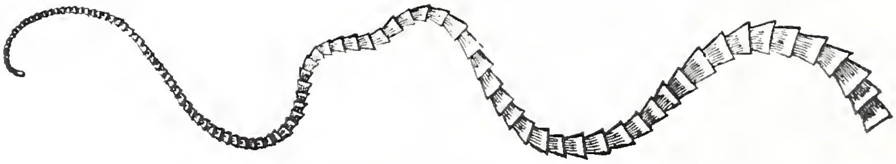
Of all varieties of poultry, guinea fowls and pea fowls are least subject to the ravages of parasites. Of the other varieties, those that live on dry land seem to be more troubled with parasites than those that swim in the water, as ducks and geese.

1. TAPEWORMS—CESTODES.

A tapeworm is a row of more or less distinct organisms joined together in the form of a band or tape. At one end there is a somewhat conical or globular segment supplied, at its free end, with four suckers, and in the center between these with a crown of thorns.

This segment is usually termed the head of the tapeworm, but in reality it is not a head for the tapeworm has and requires no head. It has no mouth, no eyes, no nervous system, no intestinal canal. It derives its nourishment from the fluids surrounding it by absorbing them through its outer skin. The first segment, popularly termed the head, is known in scientific language as the *scolex,* and its function is to attach itself to the lining membrane of the intestines by its suckers and hooks, and by a process of division develop tapeworm joints from its other extremity.

The segments close to the scolex are small and immature, further away they are larger and more developed, at the end of the chain they are mature or ripe. The ripe segments are detached from time to time and pass into the contents of the intestinal canal and escape from the body with the faeces. These mature segments are provided with contractile fibres in their walls and are able to move about. They contain eggs. Their life outside of the animal in which they are developed is short, and when they die and break open the eggs escape. If these fall in a damp place, they retain their vitality and power to mature for a long time, in some cases many months.



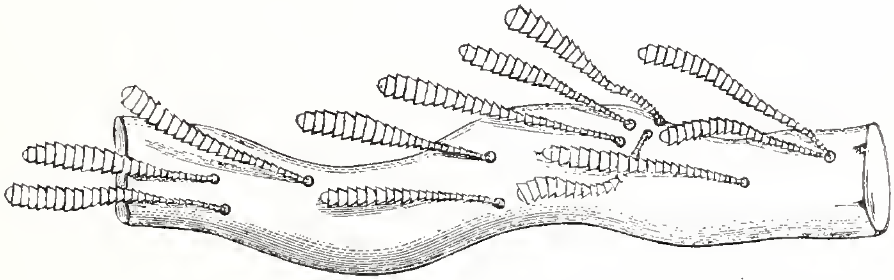
A TAPE WORM OF FOWLS—*Drepanidotœnia infundibuliformis.*

A remarkable and interesting fact in connection with the life history of the tapeworm is that the eggs will not develop into mature worms in the body of an animal belonging to the species of the one in which they were produced. It is necessary that they should first enter the body of an animal of a different species and there develop into embroyos, which pass through the walls of the intestinal canal and penetrate to distant parts of the body. There the embroyos remain in a somewhat more advanced state of development until their host dies and is consumed by an animal belonging to the species of the original host.

This can be illustrated by briefly describing the life history of one of the common tapeworms of man (*Tœnia soleum*) usually called the "pork tapeworm." The eggs from the mature tapeworm of this species pass from the body of a person harboring it and some of them are consumed by swine. They hatch out in the stomach or intestines of the swine, penetrate the intestinal walls and reach the muscular portion of the animal. There, they constitute the so-called "bladder worm" or "measles" of pork. The hog is slaughtered and if its flesh is eaten raw or imperfectly cooked, the consumer swallows the living parasites which develop in the intestinal canal into mature tapeworms.

In the same way, it is necessary for the tapeworms of fowls to pass through the body of an intermediate host before they can re-appear as tapeworms in fowls. It has been shown by definite experiments and numerous observations that the intermediate hosts in some cases are small animals such as snails, molluscs, worms and insects and it seems probable that these animals are the intermediate hosts for bird tapeworms in all cases.

A single tapeworm in the intestinal canal of a fowl may do no harm. But when they are numerous, symptoms of disease appear. One of the first effects is the irritation of the membrane lining the digestive tract. This produces diarrhoea and may lead to loss of flesh. Zürn has observed that fowls afflicted with tapeworms have an unusual thirst and an especial liking for cold water of which they drink large quantities and he claims that this symptom should always be regarded with suspicion. In time, as the result of the continued irritation of the intestinal canal and the fact that much of the nourishment that it contains is diverted to the worm and lost to the fowl, the bird becomes weak and thin. Its droppings are frequently mixed with mucus and sometimes with blood. A close examination of them may sometimes reveal segments of the tapeworm and a careful microscopic examination may reveal eggs in large or small quantities. Sometimes the tapeworms indirectly produce an irritation of the nervous system that is characterized by fits.



Intestine of a Fowl Turned Inside Out to Show Tape Worms.

If the afflicted fowl dies, it will be found that its organs are pale and contain but little blood. If the intestinal canal is opened the tapeworms can be discovered hanging by their thin ends to the mucous membrane, with the rest of the body floating in the canal. It is easiest to discover the worms when the intestine is opened with a pair of scissors while it is held below the surface of a basin of warm water.

Illinger has described an outbreak of tapeworm disease among geese that was so extensive that it became almost impossible to raise these fowls in a certain district. When the goslings reached the age of ten or twelve weeks they would commence to become thin, notwithstanding the fact that their appetites continued good, and finally they would develop epileptiform fits and severe diarrhoea and shortly thereafter would die. Death usually occurred within two weeks after the appearance of the first symptoms. Upon dissecting these birds, tapeworms (*Tænia lancolata*) were found in the intestines in great numbers.

As to the treatment of fowls afflicted with tapeworms, a large number of remedies are recommended and used with more or less profit.

One of the standard remedies among European poulterers is powdered bark of the pomgranate root, of which one teaspoonful is apportioned for the feed of each fifty chickens. Powdered areca nut may also be used in doses of from thirty to forty grains mixed with butter to form a pill. This quantity should be administered to each bird, but it is not a good remedy for turkeys. Dr. Stiles of the Bureau of Animal Industry has recently experimented with the oil of turpentine as a remedy for fowls and finds that the largest safe dose is about one tablespoonful. This remedy is very useful for the purpose of removing parasites of all kinds from the intestinal canal of most of the domestic animals and it is altogether probable that it will prove of considerable value in treating fowls with tapeworm. It should be followed by an equal quantity of castor oil. As with most other diseases of poultry it is very much better to prevent than to attempt to cure, and knowing what we do with reference to the development and life history of tapeworms it is quite possible, in most cases, to avoid their effects.

To prevent tapeworm disease among fowls it is important, first of all, to keep no birds in the flock that are supposed to be infested by tapeworms. It is also important that fowls should not be allowed to roam where other fowls are known to have contracted or carried these parasites. Especial attention should be devoted to the removal of droppings of fowls that may possibly be infested and these droppings should either be destroyed or treated in such a manner that the tapeworm eggs in them may be killed. This can be done by disinfecting them with a strong solution of carbolic acid, quicklime, or as Dr. Stiles suggests, by keeping them in a dry place for several months or through the winter, for it is probable that they can not withstand this treatment.

If fowls are raised on fresh uncontaminated land there is but little danger that they will become infected.

Dr. V. A. Moore of the Bureau of Animal Industry has recently called attention to a peculiar disease of chickens that is characterized by the development of small nodules in the walls of the intestine. These nodules were about a sixth of an inch in diameter and quite hard. When opened it is found that the larger ones contain greenish pus. These nodules were produced by a small tapeworm recognized as *Davainœ tetragona.* This disease has been recognized in fowls from the District of Columbia, North Carolina and Virginia but has not as yet been discovered among the poultry of Pennsylvania. It is quite destructive.

2. SUCKING WORMS—TREMATODES.

These worms are of an oval shape, have rather plump bodies and are provided on their ventral surfaces with suckers by means of which they attach themselves to the part they are in contact with.

There are several species that infest the domestic fowl but it is not known that any of them are very prevalent or very destructive in this country. Their mode of development is similar to that of tapeworms; that is, it is necessary for the embryo to pass through an intermediate host, as a worm, before it can develop into a mature parasite in the body of the fowl. The symptoms occasioned by these parasites are similar to those produced by tapeworms but are of a less violent and serious character.

The remedies and means of prevention are practically the same.

3. ROUND WORMS—NEMATODES.

The round worms are elongated and usually quite slender parasites, mostly of a whitish color and are provided with a mouth and digestive canal. When present at all they are apt to exist in considerable numbers, and sometimes occur in vast quantities. There is one form of round worms known as *Trichosoma contortum*, a little white worm from one-half to three-fourths of an inch long, that has been found beneath the mucous membrane lining the oesophagus and crop. Sometimes as many as thirty of these worms have been found in the oesophagus in a single bird. They interfere seriously with the passage of food through this tube, affect the digestion and appetite and cause wasting and weakness. At length, the oesophagus becomes engorged with food, it cannot contract or pass its contents along and the animal dies within a few days.

Some species of round worms collect in the intestine in great numbers, in fact as many as five hundred have been removed from the body of a single fowl. By their presence, they occasion a good deal of irritation of the digestive tract, interfere with nutrition, cause diarrhoea and weakness and death. Sometimes the disease caused by these parasites follows a long course and does not terminate fatally for a number of weeks or perhaps not at all. In other cases, death results very quickly. The termination depends upon the strength of the fowl and the number and variety of the worms. If the worms are present in sufficient numbers to entire occlude the intestine, death is produced very quickly.

Another species of round worm, *Heterakis maculose*, hasoccasioned great loss among birds. This worm is white, cylindrical and pointed at each end, the male is about an inch long and the female one and a quarter inches. Sometimes several hundred of them are found in the intestine of a single pigeon.

A Round Worm of the Pigeon.
Heterakis maculosa—Natural size. The common pin worm. A, male; B, female.

Birds with round worms may be treated by administering the remedy recommended by Baronio, consisting of equal parts of the root of male shield fern, tansy and savory, of which mixture one drachm is made into a tea with six ounces of water and this fluid is mixed with sufficient flour to form pills and these are administered to the infested fowls. Or, the powdered areca nut may be given in doses of from thirty to forty grains for chickens and fifteen grains for pigeons.

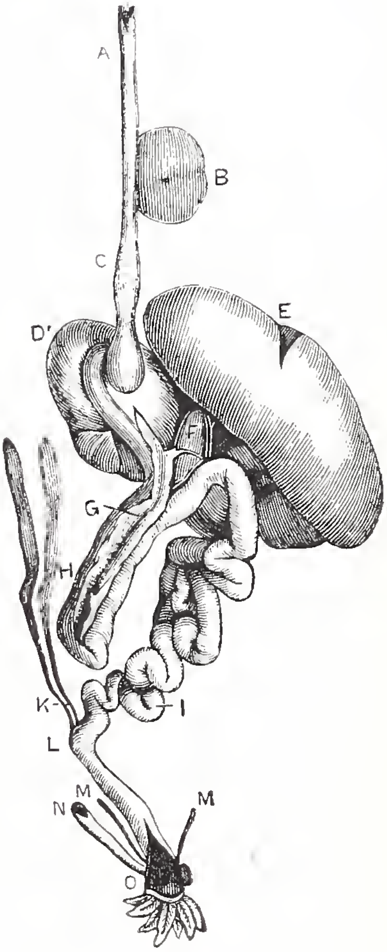
The prevention of disease resulting from the presence of the round worms may be accomplished by enforcing the general regulations recommended above, in connection with the discussion of tapeworms. The frequent removal and the care of the manure is very important.

A. *Those not caused by parasites.*

1. CATARRH OF THE CROP.

When, for any reason, the contents of the crop stagnate for an unusual length of time it may undergo fermentation, just as food accumulated in any other warm, moist place would undergo fermentation, and this results in the production of a rather irritive compound which, acting for a more or less prolonged period upon the lining membrane of the crop, produces a superficial inflammation known as catarrh. The same result may occur when parasites are embedded in the lining membrane of the crop or when fowls eat irritant materials.

This condition may be recognized by the appearance of a swelling in front of the breast which is soft to pressure and sometimes so very soft and drumlike that it is evident that it contains gas. The appetite is entirely lost or becomes abnormal, the fowl is mopish, its feathers are ruffled and it may attempt to vomit. If the crop is pressed upon forcibly, sour and offensive smelling material may be expelled through the mouth.



DIGESTIVE APPARATUS OF BIRDS.

A, œsophagus; B, crop; C, infundibulum; D, gizzard; E, liver; F, gall bladder; G, pancreas; H, duodenum; I, small intestine; K, cæca; L, large intestine; M, ureters: N, oviduct; O, cloaca.

The cure of this condition is not difficult unless it has continued for such a long time that the fowl is considerably weakened. The irritant, fermenting or putrifying contents should be expelled by pressure from without while the fowl is held with the head down. Then a small quantity of salicylic acid (two grains) dissolved in water should be administered for the purpose of checking further fermentation or hydrochloric acid may be given in one drop doses diluted with two teaspoonfuls of water. The fowl should be kept from food for a day or two and usually this is all that the case requires.

2. OBSTRUCTION OF THE CROP.

If a fowl has gorged itself with food that is difficult of digestion, such as old and dry grain or hard and indigestible substances, as straw, wood, stones, etc., and this material remains in the crop for several hours the walls of the crop will become exhausted by the unusual distention and then the fowl is unable to remove the obstruction in any way. The recognition of the condition is not difficult because there exists a large, firm, hard swelling in the region of the crop. Upon feeling of it, the nature of its contents can frequently be determined.

If it is not possible to remove the contents by pressure, as in the case above and if it does not pass away naturally within a day, it becomes necessary to perform an operation for the purpose of emptying the organ. To do this, the feathers should be removed by clipping them off with a pair of shears from a vertical line about half an inch wide along the most prominent portion of the crop. Then with a sharp, clean knife an incision about one inch long should be made through the skin and down to the obstructing material. This can then be removed with the handle of a spoon, or with the finger, or with the loop of a hairpin. When the crop is thoroughly emptied, its walls should be united by sewing them with white silk. Care should be taken to avoid including anything besides the walls of the crop in the first seam. After this is perfectly united the other tissues and the skin may be drawn together with a second set of stitches. The sewing should be done neatly and the tissues should not be drawn together so that they pucker. The ends of the first set of stitches should be left long and allowed to hang outside of the wound. In five or six days' union will have taken place and the stitches can then be removed by cutting through them with a pair of sharp scissors and drawing them out. After this operation, the bird should be allowed no food for twenty-four hours, and only a small amount of water, to which a few grains of salicylic acid have been added.

3. SIMPLE INDIGESTION AND LOSS OF APPETITE.

These conditions result from such a variety of causes that it is rather difficult to classify them as a disease. Usually they are merely symptoms of disease in different organs or of general disease. If, after a careful examination, no cause for loss of appetite can be discovered it may be that it merely results from indigestion and will respond to appropriate treatment for this condition. But in all cases, a very careful examination should be made for other diseases. Frequently, indigestion is produced by too rich food given in large quantities and especially when the bird is unaccustomed to it. Sudden changes of diet are also detrimental and when birds are exposed to weakening influences, such as sudden changes of weather, unsanitary conditions, etc., they may find it impossible to digest the food that they are accustomed to and have been thriving upon. Or, indigestion may result from feeding things that cannot be digested or that are digested very slowly and ferment while passing through the digestive canal. Putrid food of all kinds will come within this class. Sometimes, foreign bodies lodge in the crop or gizzard or other point in the digestive tract and if they are sharp and cannot be digested or dissolved, they may remain stationary for a long time, causing serious inflammation and possibly death. If it is discovered that substances, such as large pieces of glass, or pieces of metal, etc., are present, they should be removed by an operation similar to the operation performed in impaction of the crop, provided they are in the upper or neck portion of the gullet.

When the cause of loss of appetite is known the selection of an appropriate form of treatment is a matter of but little difficulty. If it is decided that the fowl cannot be cured it will be best in all cases to kill it at once so that it may be saved for food. If the disease is allowed to go on until serious changes take place it will not be safe to use the flesh.

It is well to begin treatment by giving two or three teaspoonfuls of castor oil to empty the bowels and remove irritant substances.

One of the best general remedies is hydrochloric acid. This substance is very strong and must be administered in very small quantities freely diluted with water. The dose for an adult fowl is from one to two drops given with at least a dessert spoonful of water. Pills of either black or red pepper, are in high repute among poultry keepers and are undoubtedly quite efficient in stimulating the secretion of digestive juices and in that way leading to restoration of appetite. Chopped onion or garlic in the food are also good.

4. IRRITATION OF THE DIGESTIVE CANAL AND DIARRHOEA.

This subject has been considered in part in connection with the condition produced by intestinal worms and with the subject above. Similar irritations of the membrane lining the digestive canal may be produced by other foreign bodies in the intestine or, what amounts to the same thing, by indigestible or imperfectly digested food that remains there for an unusual length of time. The first evidence of irritation of the digestive tract is loss of appetite and general depression. This is quickly followed by diarrhoea and the voidings are sometimes mixed with mucus or, in bad cases, with blood. When this symptom appears the fowl loses flesh very rapidly, becomes weak and soon dies.

The first measure in the way of treatment is to place the bird in a warm dry place where it will not be annoyed by its companions and supply it with small quantities of food that is easy of digestion. This should be given in a fresh state in clean troughs or vessels and all of the surroundings should be kept clean. If the diarrhoea is severe, cooked food should be preferred, such as boiled meal, rice or barley; oat meal is also good. Small pieces of chocolate constitute a useful remedy for this condition in cage birds. Linseed meal is also good and the gelatinous substance that separates from linseed when it is boiled is of great value in diarrhoea. It is good of itself and it also furnishes an excellent medium for the administration of other more active remedies. Opium can usually be relied upon to check this disease unless it has gone so far that no treatment will avail. Opium is best used in the form of the tincture, known as laudanum. The dose is from five to ten drops. Tincture of catechu is very efficient and may be given in doses of five to twenty drops with a little water for each fowl or for fifty fowls, half ounce in meal.

5. CONSTIPATION.

Constipation is the opposite of diarrhoea but it is frequently produced by the same conditions. If parasites obstruct the intestinal canal, of course nothing can pass and the result is constipation of a most obstinate form. Sometimes the intestine becomes unusually dry, particularly after a bird has been afflicted with diarrhoea for some time, then its contents accumulate in hard masses and form obstructions. These obstructions of dry intestinal contents may appear at any point of the canal but frequently develop close to the lower opening, in the diverticulum known as the cloaca.

Constipated birds give evidence of the condition by uneasiness, loss of appetite, frequent, unsuccessful attempts to defecate and general depression. If the obstruction is in the lower part of the bowel the treatment consists in injecting small quantities of warm water by means of a rubber syringe, or water in which linseed has been boiled may be used for this purpose and should be preferred in cases where there is considerable irritation. Sweet oil or glycerine may also be injected, all of which tend to soften and facilitate the removal of the impacted masses. When this treatment is applied to hens great care should be exercised to prevent the introduction of the nozzle of the syringe into the opening of the oviduct. Sometimes it is necessary to employ a small blunt instrument, such as the handle of a small spoon to facilitate the removal of the faecal masses in this location.

Internally, castor oil is a valuable remedy. It should be given in doses of two teaspoonfuls; or, the common compound cathartic pill may be administered. Calomel is also a good laxative or purgative for fowls and is given in doses of from one-half to two grains mixed with sufficient butter to form a pill. Small cage birds should receive a fragment of a cathartic pill, the size depending upon the size of the patient. Epsom salts are good and safe, the dose for an adult fowl is one tablespoonful of a saturated solution.

6. POISONING.

Fowls may be poisoned by the same chemicals and agencies that poison larger animals.

Poisoning with Arsenic. — One of the most frequent poisons is arsenic in one of its numerous forms. Arsenic is used so freely on farms for the purpose of poisoning potato bugs, worms that infest trees, rats, etc., that it frequently happens that it comes within the reach of poultry and poisons them. The symptoms of arsenic poisoning are loss of appetite, great thirst, discharge of saliva from the mouth, attempts to vomit, anxiety, restlessness and diarrhoea. Before death the bird may evidence considerable pain, breathe with difficulty, tremble and it may have convulsions.

After death, the examination of the digestive tract will show that it is considerably inflamed. It is red, full of blood and its contents are mixed with blood.

The treatment to be employed when it is known that fowls have been poisoned with arsenic is to administer the white of an egg every hour or the thick liquid in which flaxseed has been boiled. If possible, the chemical antidote, iron sesquioxide or dialized iron, should be given. If there is much diarrhoea and pain tincture of opium in doses of five to ten drops is useful. Powdered chalk given in water is also good.

Poisoning with Salt.—Small quantities of salt are very beneficial for fowls but large quantities may cause serious illness or even death. From half an ounce to an ounce of salt is fatal for a chicken. This quantity will cause loss of appetite, great thirst, redness of the membranes lining the mouth and throat, pain and diarrhoea and if the poisoned fowl is opened after death it will be found that the intestines are in a condition resembling that found when death results from arsenical poisoning, but usually the inflammation is not of quite such a severe type. Such substances as mackerel brine, beef pickle, etc., are even more poisonous than pure salt and smaller quantities will produce the same symptoms.

The treatment consists in the administration of the remedies recommended for arsenic poisoning, with the exception of the iron compounds.

Poisoning with Moulds.—When fowls are permitted to eat food that has undergone decomposition or has become very mouldy they are sometimes poisoned. This subject has been referred to under the head of irritation of the digestive canal and diarrhoea.

7. DROPSY.

The membrane lining the abdominal cavity sometimes becomes inflamed as the result of external injuries or severe irritation of the intestinal canal or the penetration of a foreign body through the intestinal wall. Sometimes this condition is caused by parasites. Usually the disease is of a severe type and cannot be treated successfully. It may produce death within a very short time. But sometimes it follows a chronic course, causing prolonged illness, and in these cases, fluid usually collects in the abdominal cavity constituting the condition known as ascites or abdominal dropsy. The evidence of this condition consists in an enlargement of the abdomen: it is distended in all directions but particularly downward and sometimes to such an extent that the lower part of the belly reaches the ground. It is hardly necessary to say that in these cases the fowl is spiritless and disinclined to move about actively; when it is caught and the swelling is examined by the touch it will be noticed that it is soft and that by pressing upon one side waves can be felt on the other side indicating that it contains fluid.

The treatment of these cases is not profitable.

8. JAUNDICE OR THE YELLOWS.

When the action of the liver is interfered with the bile may not be poured out into the intestine in a normal manner and its retention leads to a yellow discoloration of all parts of the body, shown especially about the comb, orifices of the nose and membrane lining the mouth and throat. This condition is frequently produced by parasites but sometimes it results from too high feeding and too little exercise. In these latter cases, a dose of calomel should be administered, the food, which must be cut down in quantity, should be of a simple character and contain green substances and the fowl should be allowed plenty of exercise.

CHAPTER IV.

DISEASES OF THE EGG-PRODUCING ORGANS.

1. PARASITES AND FOREIGN BODIES IN EGGS.

The egg is produced as follows: the yolk develops in the ovary, which is a large conglomerate mass, the appearance of which may be compared roughly to that of a bunch of grapes of different sizes. When the yolk reaches its full development in this organ, the membrane containing it breaks and it is discharged into the oviduct. In passing through the oviduct it becomes surrounded by albumin, known as the white of the egg. The development of the albumin requires about six hours. In the lower part of the oviduct, it remains for about twenty-four hours and during this time it becomes covered with a membrane and a shell.

If foreign bodies, or parasites of any kind, are present in the oviduct, they may readily become incorporated with the albumin and in that way become enclosed in the egg. There are a number of parasites of poultry that have been found encapsulated in this way. The imprisonment of parasites in the egg is not a very serious matter, however, because it occurs quite infrequently; but it is serious when the germs of decay are present in the oviduct and become imprisoned in the egg, because this leads to the early decomposition of the egg. The organisms that may enter the egg in this manner and produce decomposition are of several kinds, but as their effects are about the same it is not important to discuss them separately. They cause the yolk to become light in color and cloudy and cause the liberation of gas that is usually taken up by the fluid parts of the egg, but escapes when the shell is broken and is of a most unpleasant odor.

These germs do not get into the oviduct by passing into the fowl with its food, water or the air that it breathes, but enter through the cloaca, and are often introduced by the organs of the male during the act of copulation. This condition may be avoided by the enforcement of cleanliness in the poultry houses and poultry yards. Hens and cocks should never be allowed to go about with masses of filth adhering to the feathers about the vent nor should they be compelled to roost in filthy places or walk about and scratch in masses of decaying and putrefying material.

Cleanliness and disinfection enable the poulterer to avoid this infection of the egg.

2. MALFORMED EGGS.

One of the most frequent malformations of eggs is the so-called "double egg," the egg containing two yolks. These eggs are usually of very large size and develop when two yolks reach maturity in the ovary at the same time and are discharged into the oviduct together. Cases have been known in which three yolks were found in the same egg.

Sometimes eggs of unusual shapes are noticed, they are pear-shaped, spherical, flattened, pointed at each end or bent. Sometimes they contain projections at some point on the surface. All of these conditions result from accidental influences, and as a rule they do not recur.

An important malformation, or rather lack of development, consists in the production of eggs without shells or with soft shells. This condition usually results from the fact that the hen which produced the egg laid it before the shell had had time to develop or that she was not supplied with the proper kind of nourishment and therefore could not produce the lime salts necessary for the secretion of the shell.*

The treatment in the latter case consists in giving fowls ground oyster shells, broken egg shells or pieces of ground bone.

3. EGG BOUND.

Sometimes an egg becomes caught in the oviduct and cannot be expelled. It may be that this comes from the fact that the egg is too large or that irritation or inflammation has caused a swelling that obstructs the passage, or that the cloaca is obstructed with a mass of faeces. In these cases, it is necessary to supply assistance. If it is found that the cloaca is obstructed, the faecal masses should be removed in the manner described under constipation. If the egg is large, or the passage small, the injection of oil or glycerine may enable the hen to expel it. If, however, it cannot be removed in this manner an attempt should be made to expel it by placing the hen upon her back and pressing above the egg through the abdominal walls and in that way forcing it out. If it cannot be removed in this way, the only alternative is to break it and remove the shell piece by piece. The fragments of shell should be removed with the finger or a pair of forceps. When the pieces of shell cannot be removed at once, sweet oil should be injected in order to lubricate the passages as freely as possible and facilitate the removal of the sharp, broken pieces.

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* See Inflammation of the Oviduct.

4. INFLAMMATION OF THE OVIDUCT.

The oviduct sometimes becomes inflamed as the result of the manipulations necessary to overcome the condition of egg-bound, and sometimes it becomes inflamed from causes that are not understood. When this inflammation exists, the hen makes movements as though she were attempting to lay an egg, is very uneasy, rubs the posterior portion of the body along the ground, and in these ways indicates irritation of that part. Sometimes the first symptom of beginning inflammation of the oviduct is the production of eggs with soft shells. This condition has been found not only among chickens, but also among ducks, geese and turkeys.

The treatment of this disease is not very satisfactory. It consists in placing the bird in a quiet place where it will not be annoyed and, in acute cases, injecting a weak solution of tannic acid (1 part to 100), to which a small quantity of chlorate of potash (2 or 3 parts to 100) has been added. This fluid should be made warm before it is injected, and should be administered carefully and in small quantities. The best syringe for this purpose is a soft rubber bulb supplied with a hard rubber nozzle. Laxatives, such as castor oil or calomel should be administered in sufficient quantities to keep the bowel loose. The food should be non-stimulating, and given in small quantities.

5. PROLAPSUS OF THE OVIDUCT.

As a result of great straining to expel an unusually large egg, the oviduct may be turned inside out and project from the body of the hen. It can then be seen as a red swelling protruding from the rear part of the body, the hen becomes very uneasy, and it is impossible for her to lay eggs while in this condition. In examining these cases, particular attention should be paid to the color of the inverted membrane. If it is very dark, and of a purplish or bluish tinge, treatment should not be attempted, for this indicates that gangrene is about to begin, and in these cases the fowls can not be saved, so that it is better to destroy them while still fit for food. If the membrane is red, it should be washed off with warm water, covered with a thin coating of vaseline and pushed back very carefully. If it is expelled again it should be again returned and a small piece of ice placed in the opening. This will usually cause the parts to contract to such an extent that they will not fall out. From the beginning of the treatment, the hen must be kept in a quiet place and allowed very little food.

CHAPTER V.

DISEASES OF THE BRAIN AND EYE.

1. CONGESTION OF THE BRAIN.

Congestion of the brain may be caused by extreme excitement, by blows on the head or sunstroke. It is characterized by staggering, stupor, unusual movements such as walking backwards or walking in a circle, unusual and irregular movements with the wings and feet and twisting the head backwards or to the side. Sometimes the bird will fall on its side and make peculiar movements with its feet and wings, as though attempting to run or fly.

The treatment consists in keeping the animal perfectly quiet in a dark place, the administration of laxatives, such as two teaspoonfuls of castor oil or one and one-half grain doses of calomel, and the application of cold cloths or ice to the head.

2. EPILEPSY.

Epilepsy is not a very common disease among poultry, but still it is met with from time to time and among all varieties of barnyard fowls. It is characterized by the occasional occurrence of fits which do not terminate fatally, disappear after a time and leave the fowl in a normal condition. During the fit, the fowl will make beating movements with its wings, its legs will draw up and it will fall down, sometimes turn over on its back, or it may stand upright with its legs apart, head turned backward and the mouth and eyes opening and closing spasmodically. Epilepsy is sometimes caused by intestinal parasites, and is cured by the removal of these worms. It is claimed that bromide of potash given in quantities of a few grains each day in the drinking water is of value in these cases, but it is not probable that treatment will prove to be at all profitable.

3. FEATHER EATING.

This habit is classed among the affections of the nervous system because if it is not a nervous disease it is such an overpowering habit that it can scarcely be distinguished from the disease.

Where this habit is prevalent in a poultry yard, the fowls present a most untidy appearance, the feathers about the neck and upper part of the breast are plucked out, and sometimes they are partially removed from other parts of the body. If the flock is watched for a little while it will be noticed that the birds pluck the feathers from each other. This habit usually starts with one fowl and spreads by force of example to the others.

In order to prevent it, a fowl that is noticed plucking feathers should be at once removed from the flock before the others have had time to learn the habit. If it is not desirable that the bird should be killed, several methods for preventing the continuation of the habit are recommended. The best and most humane is to file away the bill in front and on the sides so that it will not close tightly, but when shut leaves a space of about one-tenth of an inch. This will prevent the bird from grasping the feather with sufficient force to remove it, but will not interfere with eating. Another remedy that has been suggested is to place a piece of wire through the mouth as a bit and carry the upper end of wire through a hole that has been punctured in the comb. This has the effect of preventing the fowl from closing the beak tightly, and therefore from pulling out the feathers, but is rather a cruel procedure and cannot be recommended. In all cases, fowls inflicted in this way should be allowed a large yard, so that they may have plenty of exercise.

4. EGG EATING.

This is another habit that spreads from fowl to fowl similar to the above. If eggs are allowed to remain too long in the nests so that they become broken, or if soft shell eggs are produced by any of the hens in the flock some of the fowls may get into the way of eating them, and the habit once started spreads from bird to bird until in some cases it becomes almost impossible to secure any eggs at all.

The treatment in these should be to remove the bird that spreads the habit as soon as it is detected, or if this is not done, and the habit becomes well established, a special form of nest should be used which permits the egg to roll out and escape from the reach of the hen as soon as it is deposited.

5. TUMORS OF THE EYELIDS.

Sometimes warty growths appear upon the eyelids and they may become large enough to interfere with the vision or by pressure upon the eye balls destroy the sight. Not only warty growths appear in this region, but also other tumors of a variety of kinds. When it is evident that they are becoming large enough to become harmful, they should be snipped off with a pair of sharp scissors, and the wound cauterized with lunar caustic.

6. INFLAMMATION OF THE EYE.

Inflammation of the eye is sometimes caused by parasites and sometimes by mechanical irritation such as blows, wounds received in fighting, etc. Or, the eyes may become inflamed as a result of taking cold. These inflammations are of different kinds and different degrees of severity, dependent upon the part of the eye affected and the extent of the injury. In most cases, they are characterized by swelling of the eyelids, interference with vision, cloudiness of the front of the eye, sometimes, total blindness. In the latter case, treatment is not to be recommended; the fowl should be destroyed at once. But if the trouble affects only one eye, or is not of an unusually severe type, it may be treated by cleansing the eyelids with warm water, to which boracic acid has been added in the proportion of 15 grs. to the ounce. The fowl should be kept in a dark place and fed small quantities of food and allowed plenty of fresh air until it is recovered. Cloudiness of the front of the eye—the cornea—may be treated by dusting a small quantity of calomel over the surface and repeating the application once daily as long as necessary.

A strong solution of common salt is a good eye wash for simple troubles.

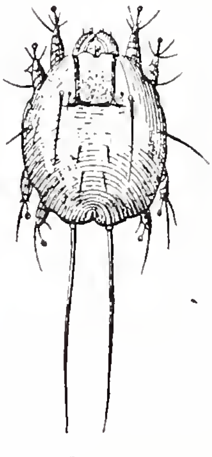
CHAPTER VI.

DISEASES OF THE LEGS AND FEET.

A. *Those caused by parasites.*

MANGE OF THE LEGS AND FEET.

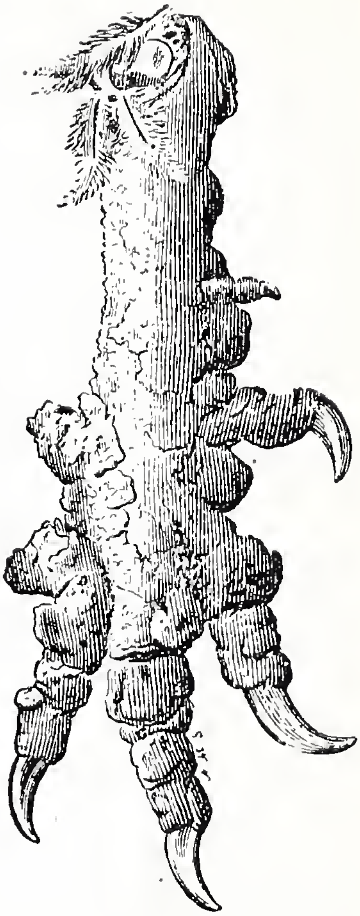
Mange of the legs, or chalk legs, is a contagious disease caused by a parasite known as *Sarcoptes mutans.* It is confined exclusively to the legs and feet and never extends to other parts of the body. When the parasites of this disease are placed on the legs of a healthy fowl they work their way under the large scales on the front of the leg or on the upper part of the toes. They multiply rapidly and within a short time it may be noticed that the scale commences to rise and a little yellowish crust forms about its edge. In time, other scales become involved, the crust increases in thickness and scurfy, powdery material piles up in considerable quantity until in old cases the entire feet and legs may be involved and to such an extent that they seem to be several times their normal thickness. When this thick crust is pulled off it is found that the surface is raw and bleeding. The interior of the crust is hollowed out by a great number of small cavities and a close examination of these cavities will show that they contain parasites. Frequently, a cavity will contain an old female and a large number of young. These young are born alive, so that no eggs are present in the scabs unless a female has been crushed and the eggs have escaped from her body.



THE PARASITE OF MANGE OF THE LEGS AND FEET..

Sarcoptes mutans—male—100 times natural size.

In time, the disease becomes so bad that the bird cannot walk. It lies on its breast, hops about from place to place, becomes thin and at last dies from exhaustion.



The Foot of a Fowl Affected With Mange.

It is not very difficult to cure this disease provided careful attention is devoted to it. The first thing to do is to remove the diseased fowl from the flock, disinfect the poultry house, the nests and perches. The treatment of the individual begins with the removal of the scab so that the parasite may be reached and destroyed. The scab may be removed by soaking it with oil, either sweet oil or cotton-seed. This should be applied freely and allowed to remain for twenty-four hours, after which large sections of the crust may be taken away without pain to the bird, or vaseline or soft soap may be used for the same purpose. The action of the oil may be intensified by wrapping the legs in cotton after it is applied and binding the cotton on with a narrow bandage or with a soft cord. Following the removal of the scab, the legs should be treated with a solution of balsam of Peru in alcohol, equal parts. Or strong sulphur ointment or creolin solution (one part, water, ten parts) may be applied once daily.

B. *Those not caused by parasites.*

1. CORNS.

As a result of standing on too sharp or too narrow perches or having to fly from heights on to a hard floor, the feet of fowls are sometimes irritated in such a way that the skin becomes thick, hard and painful. These thickenings constitute corns and occasion some lameness and when the bird is caught and examined closely the cause of the trouble can be recognized without difficulty.

The treatment consists in paring the elevation off with a sharp knife, painting the surface with tincture of iodine and removing the cause by making the perches wide and smooth or lowering them, as may be required.

2. BUMBLEFOOT.

The causes that produce corns will, if of an especially severe type, cause deep and serious bruises of the joints of the feet and legs. These bruises are followed by swellings of the joints, the parts become very tender and sore so that it becomes difficult for the bird to walk. The principal joint of the foot may become very much enlarged so that the deformity can be seen from a considerable distance. A close examination will show that the swelling is very painful to pressure and is sometimes feverish and soft. If it does not terminate within a short time, germs from the injury may enter the bones or pass to joints further up the leg and lead to swelling, great soreness and sometimes to abscess formation or gangrene.

The causes of bumblefoot should be avoided and the treatment of the condition consists in applying flaxseed poultices, by tying a bag of cheesecloth containing the poultice around the foot, or applying an ointment made of creolin and vaseline (one part to forty). If the swelling becomes soft, so that it is evident that it contains pus it should be opened by making an incision into it with a sharp knife and its contents should then be syringed out with a solution of creolin and water (one part to fifty). In the more severe cases accompanied by the formation of large abscesses or gangrene no treatment can be successful. Some cases of bumblefoot develop to a certain extent and then continue in the same condition for a long time leaving the fowl with a chronic deformity of the feet. These old cases are best treated by painting the enlarged joints with iodine or by opening the swellings and applying iodine to their interior.

3. GOUT.

Fowls of the heavy breeds, when kept in a high condition and allowed but little exercise, may develop a disease that is practically identical with gout in man. It usually develops rather slowly beginning as a somewhat indefinite lameness that might be mistaken for rheumatism. But shortly the joints of the feet and legs, and sometimes of the wings as well, swell, become painful to pressure, the bird becomes disinclined to move; later, little tumors, that are rather hard, appear about the affected joints and still later the skin covering these enlargements becomes dry, brittle and breaks, exposing a yellow or grayish crumbling, chalky mass which is composed principally of uric acid and its salts. Sometimes, the toes dry up, lose their life and fall off. The general spirits of the fowl are of course depressed, because it is difficult for it to get around. It becomes feverish, loses its appetite, wastes away and toward the end develops a diarrhoea that hastens death.

Treatment of gout, consists in removing the enlargements by scraping them off with a blunt instrument or cutting them away with a knife and internally bicarbonate of soda should be administered. This can be supplied by adding it to the drinking water in quantities of about a teaspoonful to the pint.

4. FREEZING.

The feet, combs and wattles of fowls exposed during very cold weather are frequently frozen. Usually but little can be done after the injury has taken place unless the condition is detected early, at which time it may be possible to save the frozen parts by removing the frost with applications of snow or cold water, anointing the frozen parts with cosmoline or camphorated oil and placing the fowl in a reasonably, though not very, warm place and keeping the frozen parts moistened with the applications mentioned.

CHAPTER VII.

DISEASES OF THE BONES.

1. RICKETS.

Rickets is a disease of the bones that prevents their becoming hard and stiff as they should, thus allowing them to bend and become deformed under the weight of the fowl. The bones that are most frequently subject to deformity in cases of rickets are those of the legs and the breast bone, because these carry the most weight. Rickets usually results from improper feeding. A growing fowl should not only have food to make flesh but also to make bone, and unless this is supplied in sufficient quantity and in an available form, the imperfectly nourished bones develop the condition above described.

The treatment, consists in giving sufficient food of a proper sort, such as grains of all kinds, ground bone, ground oyster shells, wall-plaster from old buildings, broken egg shells, etc. A composition in high repute among the poulterers of England is Parrish's chemical food. Phosphate of lime, which is the principal and most valuable ingredient of Parrish's chemical food, can be administered in doses of two or three grains per day to each young chick that is noticed to be rickety in the least degree.

2. FRACTURES.

Fractures of the legs and wings are not infrequent. As a rule, it does not pay to treat them unless the fowl is unusually valuable or a cage bird that there is especial reason for saving. Fractures of the legs can usually be splinted and the bones kept in position with little difficulty by applying a splint of cork, leather or quill. The leg should be wrapped in absorbent cotton, the bones placed in a proper position, the splint applied and then wrapped with soft wool, yarn or with a narrow muslin bandage. After splinting, the bird should be kept as quiet as possible. If it is a large adult fowl it may be necessary to place it in a small box or basket for from two to three weeks. At the expiration of this period union has usually taken place.

Fractures of the wing are somewhat more difficult to treat, because the muscles and feathers interfere with the application of a bandage, so that the best method is merely to fold the wing in its natural position against the side of the bird and hold it there by a bandage passed around the body, until the fracture has united.

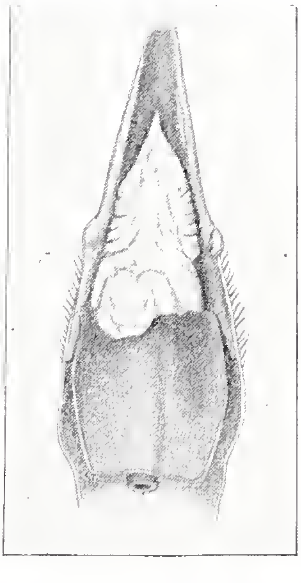
CHAPTER VIII.

CONTAGIOUS DISEASES.

1. DIPHTHERIA OR ROUP.

Diphtheria, croup or roup, is a very common disease among poultry, and undoubtedly destroys millions of dollars worth of fowls in the United States every year. There are two forms of roup, one caused by bacteria and the other by protozoa, but since the symptoms, remedies and means of prevention are very much alike in both cases it is not necessary that they should be considered separately in this report.

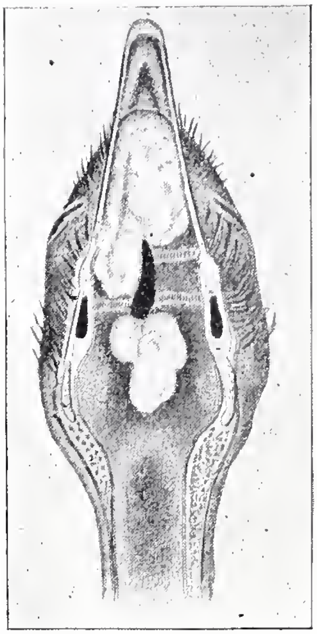
Roup is, in all cases, a contagious or "catching" disease. It spreads from one fowl to another and may be carried from flock to flock by the interchange of birds. It is thought by some that roup may be produced by exposure, and that it is merely a severe cold or catarrh, but careful observation shows that this view is not correct, and that roup can only be produced by the specific organisms of the disease. It is undoubtedly true that unfavorable influences, such as those that cause colds, predispose poultry to roup and place the birds in such a condition that they are more apt to develop it when exposed to it, and perhaps cause the appearance of the disease in a severe and fatal form when it would have followed a mild course if these unfavorable conditions had not existed. Young fowls, tender breeds, and birds in poor condition, and especially those that are poorly cared for, are most predisposed to roup. All varities of domestic fowls may contract it. It also affects cage birds and outbreaks have been described among wild birds.


THE FLOOR OF THE MOUTH OF A FOWL, SHOWING DIPHTHERITIC PATCHES.

The characteristic symptom from which this disease derives its name, consists in the appearance of white patches on the membrane lining the mouth and nose, the air passages, and these same patches occasionally develop on the skin, in the intestines or in the lungs. The patches of roup are at first white and resemble a white mould. The size of the patch is indefinite and never the same in two individuals. It may be very small, or it may extend over the entire lining membrane of the mouth. Sometimes, it appears first on the sides of the tongue, sometimes on the roof of the mouth, sometimes in the throat or about, or in, the nose or eye, on the skin of the head, or in the deeper parts of the body. At first, the fowl does not show much inconvenience. As the patch matures it becomes yellow, its borders dry, and adhere closely to the mucous membrane, and if it is large enough, it may obstruct the air passages or the mouth and cause serious difficulty in breathing. At this stage of the disease the fowl refuses food, becomes sluggish and presents the usual well-known appearance of a sick chicken. The patches sometimes putrefy and become exceedingly offensive. When they are scraped away it is noticed that the tissues beneath are raw and sore. The interference with breathing may be so serious that the bird will hold its mouth open and struggle for air like a chicken with gapes. The entire face is sometimes covered with patches of false membrane, the eye may become affected or destroyed and the air passages may be completely obstructed so that death is caused by suffocation. The corner of the mouth seems to be a favorite seat for the development of diphtheritic false membrane.

The disease usually follows a chronic course lasting several days or several weeks. In some outbreaks, however, the germ of the disease seems to be more virulent than in others, and in these cases the birds may die after the lapse of but a few days. In strong individuals, and especially where the general type of the outbreak is not of a very virulent character, the tendency is toward recovery, but the disease is nevertheless destructive, because recovered birds are frequently thin and unproductive for a long period. The fact that fowls suffering from roup do not show evidence of general disturbance until the local changes are quite obvious, is due to the fact that roup is essentially a local disease of the mucous membranes, and general disease does not result until the air or food passages are obstructed or interfered with by the patches, or general infection takes place.

The treatment of roup must begin with the isolation of the afflicted fowls and thorough disinfection of the poultry house and yards. This disinfection should be carried out with great care, and should be preceded by a thorough cleansing of the building and removal and complete destruction of the droppings. The yards should be sprinkled with lime, the feeding place should be scrupulously cleansed and disinfected, and the water supply should be looked to carefully, in order to avoid possible impurities or contamination. The fowls that die should be cremated or deeply buried at a distance from the poultry grounds. The individual patients need not be destroyed as is sometimes done, because it is frequently possible to save them by means of very simple treatment. It is important to place them in warm, dry quarters, and feed nutritious, attractive food. Douglass mixture, referred to on page 28, is useful. The diphtheritic patches should be removed by scraping lightly with a blunt metal or wooden instrument, or by rubbing them off with a swab made by wrapping a small pledget of cotton about the end of a toothpick. After they are removed, the raw surface thus exposed should be treated with an antiseptic, for the purpose of destroying the disease germs that remain. One of the best applications for this purpose is a 10 per cent. solution of nitrate of silver, to be applied cautiously and in small quantities, with a camel's hair brush. Or, a 2 per cent. solution of creolin or carbolic acid may be used. A solution of corrosive sublimate (1 part to 1,000 of water) is also sufficient, but must be used with great care. Iwersen recommends petroleum in this disease and advises that a drop of this substance shall be placed in the nasal passage of the diseased fowl, and that the diseased membranes be treated with light applications applied with a small brush. If the nose is stopped up, peroxide of hydrogen, diluted with an equal amount of water may be injected with a glass and rubber medicine dropper. If the dropper has a bent point, the medicine may be squirted into the back of the nose through the openings in the roof of the mouth.


THE ROOF OF THE MOUTH OF A FOWL, SHOWING DIPHTHERITIC PATCHES.

Roup or diphtheria may be prevented by avoiding unsanitary conditions, by enforcing cleanliness, disinfecting frequently and preventing the introduction of foreign fowls into the flock until they have been kept isolated long enough to make sure that they are healthy.

Cases have been reported from time to time in which it has been claimed that diphtheria of fowls has been conveyed to people and vice versa. Recent investigations, however, indicate that this disease in man and birds is caused by different organisms, and that the probability of transmission is not very great.

With reference to this matter, Dr. V. A. Moore writes as follows:* "Although the number of reported cases of the transmission of diphtheria to the human species and vice versa is small in comparison with the extent of the disease in poultry, the evidence that such a transmission is possible is quite sufficient to discourage the careless handling of diseased fowls. It is quite a common practice, usually in the rural districts, to bring sick chickens into the house for treatment where the children of the household are allowed to fondle them at will. It is not improbable that when this disease is thoroughly investigated the number of cases of direct infection from this source will be found to be much larger than is at present supposed. Until such investigations are satisfactorily completed the indiscriminate handling of diphtheritic fowls, especially by children and the exposure of fowls to the infection of diphtheria in the human species whereby they may become carriers of the virus, should be strenuously avoided."

2. FOWL CHOLERA.

The designation fowl cholera includes several infectious diseases of poultry, none of which have been thoroughly studied in this country during recent years. The fowl cholera that occurs in France and Germany is very well understood, but its symptoms do not agree fully with those of the various diseases known as fowl cholera in this country. The Bureau of Animal Industry in Washington has made some investigations of outbreaks of fatal contagious diseases among chickens and pigeons but the work is not yet completed. So far as it has gone, it indicates that one of the affections known as fowl cholera is caused by a rod-shaped bacillus that is exceedingly resistant to extremes of temperature, and can probably live in protected places for a long period.*

The symptoms of American fowl cholera were first described by Dr. Salmon in 1880. They include the voiding of faeces of which the part that is normally white is yellow. The white part of the faeces is excreted by the kidneys, and the yellow discoloration of this excrement is usually the first indication of disease. Shortly thereafter the droppings become thin and fluid, they are voided frequently and enveloped by a layer of thin mucous. The fowl becomes depressed, it stands still or assumes a sitting posture, goes into a sunny, warm place if possible. The plumage becomes ruffled, the head is drawn down, the comb becomes pale and bloodless, and the appetite is depressed or lost. The depression and torpidity of the fowl increases until it seems to become unconscious and cannot be aroused by objects that usually frighten it. The bird becomes thin and weak and sometimes passes into a stupor and dies. In other cases, it may have convulsions prior to death.

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* Bulletin No. 8, U. S. Department of Agriculture, 1895.

The symptoms of the European fowl cholera which may also occur in this country, although it has never been proven definitely, are in many respects similar to the above. In many cases, the disease runs such a very short course that no evidence of illness is discovered until the bird tumbles over in convulsions and dies. Sometimes, the course of the disease is so rapid that more than half of a large flock of apparently healthy chickens will die during a single night. Usually, however, the disease lasts from one to three days, and is evidenced by loss of appetite, depression, ruffling of the feathers, hanging wings, inclination to get away from the flock, high temperature, discharge of mucous from the mouth, diarrhoea, thin faeces, that are at first slightly yellowish, but later on greenish and having an offensive odor; great thirst, bluish discoloration of the comb, and death either in a stupor or preceded by convulsions. After death, the dissection of the bird reveals numerous red spots on the internal organs and especially on the intestines. The lungs are congested, red, full of blood; the liver is full of blood and somewhat enlarged, and the blood itself is dark and thick. The intestines sometimes contain a red mass of clotted blood.

Another disease, that is usually included with fowl cholera is a form of infectious enteritis of chickens, which consists in an inflammation of the bowels that is of a very severe type, and causes death within one or two days after the beginning of the attack. The first symptom is diarrhoea, there is loss of appetite and depression, but the torpor is not so profound as in the disease described above.

McFadyean has recently described an outbreak of disease among turkeys that was characterized by an inflammation of the lungs and pericardium. The symptoms were general stiffness of the neck and limbs, hanging of the wings and tail, roughness of the feathers, difficult breathing, discharge of frothy mucus from the mouth, diarrhoea, with thin, whitish or yellow faeces and death. In this outbreak, a germ was found that was in many respects similar to the germ of fowl cholera, but presented points of difference that were sufficiently well marked to enable him to classify it as another organism.

Epizootic dysentery has been discovered among chickens and ducks and reported upon by veterinarians in a number of places. The disease begins as a diarrhoea, usually attacking young chickens first. There is depression, chilliness, ruffling of the plumage, loss of appetite, gradually becoming more intense until the animal dies, during the second week of the attack.

All of the above conditions are popularly known as fowl cholera, and, moreover, the term as commonly used, undoubtedly includes a number of other diseases that are not contagious at all. When fowls die in large numbers it is usually said that the disease affecting them was fowl cholera, although it may have been produced by mismanagement of almost any kind.

The treatment of individual fowls afflicted with such a highly contagious disease as true fowl cholera is not to be recommended, because in the first place, so long as the infected fowl remains around there is danger that its poisonous products may be carried to healthy birds. Secondly, there is little chance of curing it and it is hardly worth while to try.

The important point in this connection is the prevention of disease, and fowl cholera can usually be prevented by preventing the introduction of fowls suffering from it or that come from infected localities. If the disease is once introduced, the most stringent measures should be enforced as regards cleanliness, disinfection and the total destruction of the carcasses of the dead birds. The birds that are still healthy should be removed from the flock and placed in a wholesome locality. The droppings from the diseased fowls should be burned or thoroughly disinfected by mixing with a ten per cent. solution of sulphuric acid or with a quantity of lime equal in amount to the manure. The building should be disinfected by cleaning it very thoroughly, flushing the floor with a saturated solution of copperas and spraying the interior with a 5 per cent. solution of carbolic acid followed by white-washing. If the pens and runs can be abandoned for a year and grass or crops grown in them, this is the best plan, but if it is not possible to do this they should be cleaned with as great thoroughness as possible and slacked lime scattered over the surface of the earth, which should be plowed.

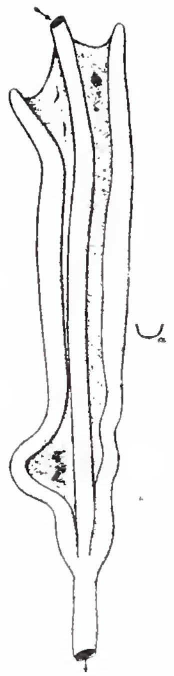
It should be remembered that the germs of fowl-cholera may be carried in the feathers, so that a perfectly healthy fowl, coming from a diseased flock, may carry the disease to another flock a long distance away. These germs may also be carried on the shoes and clothing of persons; by vermin, as rats or mice, or they may become attached to light objects, such as leaves, and be carried long distances by the wind. If the disease exists among the fowls along the water course, those lower down the stream may receive the germs with their water supply. So, whenever this disease prevails in a locality, one cannot guard his fowls too carefully.

3. BLACKHEAD—INFECTIOUS ENTERO-HEPATITIS OF TURKEYS.

The disease of turkeys popularly known as blackhead, has prevailed for a long time in the New England states and particularly in Rhode Island. Attention was called to it some few years ago by Mr. Samuel Cushman, an officer of the Agricultural Experiment Station of Rhode Island, but all of our recent information in regard to blackhead results from the investigations of Drs. Theobald Smith and V. A. Moore.*

The disease is called "blackhead" because in some of the turkeys afflicted with it, the comb and head become dark. The designation is not a good one, however, because this discoloration of the head may come from other causes than this particular disease, and sometimes in this disease the head does not become dark. As yet, a good popular, descriptive name has not been suggested.

Infectious entero-hepatitis is caused by protozoa, minute animal parasites so small and simple that they can scarcely be distinguished from some members of the vegetable kingdom. These gain access to the digestive tract of turkeys and enter the caeca, which are two prolonged pouches springing from the union of the small and large intestines. Within the caeca, the protozoa of this disease irritate the mucous membrane and cause it to become thickened and ulcerated. The caeca also become distended and sometimes extraordinarily large. The protozoa penetrate to the liver and cause there the formation of yellowish spots resembling small abscesses filled with cheesy pus. This appearance results from the death of localized areas of liver tissue. The surrounding parts of the liver are full of blood, and the entire organ is considerably enlarged. These are the principal features revealed by a post-mortem examination. The symtoms are rather indefinite because the disease does not follow a regular course, so that a slightly affected turkey may present certain symptoms, while one in a more advanced stage of the disease may present en-



CÆCA OF HEALTHY TURKEY.
The central tube is the small intestine, the food passing downward in the direction of the arrow. At the junction of the cæca with the intestine, the food is drawn into the cæca by suction. The thickness of the cæcal wall is shown in a. One-half natural size (Moore).

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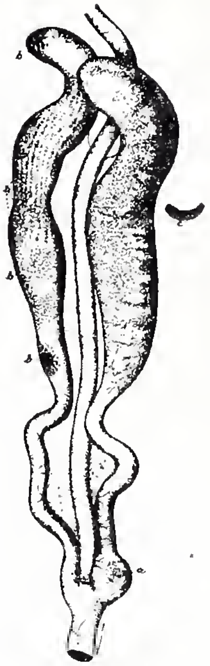
* Bulletin No. 1, Circular No. 5, Bureau of Animal Industry, U. S. Department of Agriculture.

tirely different symptoms, that may be so different from the first that no connection between the cases would be suspected by an ordinary observer. It has been noticed by those who have investigated this disease, that turkeys frequently appear to recover from it; this is, after having been afflicted, sometimes quite seriously, they pick up in condition thereafter and apparently recover, but a post mortem examination of these fowls will show distinct evidence of the disease. The walls of the caecum are still thickened, the spots in the liver remain, and a microscopical examination of the contents of the caecum reveal the living parasite of the disease, so that these apparently recovered birds continue as sources of infection and can convey the disease to other fowls.

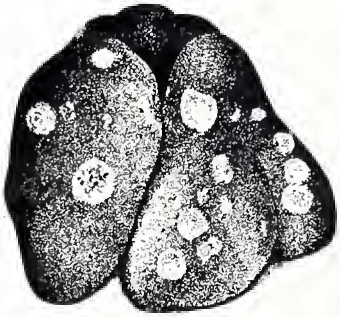
Young turkeys are most predisposed to the disease. When it is severe, they lose condition, develop diarrhoea, become thin, weak, ragged-looking, their heads sometimes become dark, and they gradually die in an emaciated, exhausted condition. The disease can be recognized positively after death by discovering the conditions described above.



CÆCA OF TURKEY SHOWING EFFECT OF PROTOZOAN DISEASE.

The upper two-thirds of one cæcum is affected, also an area, a, near the union with the colon. The other cæcum is thickened at the points, b. The thickness of the affected cæcal walls is shown in section c. One-third natural size (Moore).

Blackhead has been discovered among turkeys in eastern New York, and although its presence has not been demonstrated positively among the turkeys of Pennsylvania, it is quite possible that it exists here and some outbreaks of disease that have been described closely resemble blackhead. Our knowledge of this disease is so recent that as yet it is only possible to experiment with remedies with a view to curing the affection. Dr. Smith suggests the use of quinine and it may be that salicylate of soda, creolin or calomel will prove advantageous, but as yet the use of any drug is purely experimental.



LIVER OF TURKEY.

Showing effect of protozoan disease. One-third natural size.

It has been shown by Dr. Moore's experiments that the parasite of the disease exists in the droppings from afflicted fowls, and that it may be transferred directly to healthy birds by keeping them where these droppings have been allowed to accumulate. The malady has also been produced in healthy turkeys by feeding the diseased organs of its victims. These investigations are very important, because they indicate a means of avoiding the spread of the disease. Old turkeys on affected farms should be disposed of whether they appear to be sound or not. The roosting place should be thoroughly cleansed, droppings should be collected and disinfected and the entire locality should be disinfected as thoroughly as possible by spraying with carbolic acid solution, saturating the floors and earth with saturated solutions of copperas and covering the soil with lime. Then, if turkey breeding is to be continued, fresh stock should be purchased from regions where the disease does not exist or turkeys should be hatched under hens and in this way the nucleus of a new and sound flock may be acquired.

4. TUBERCULOSIS.

Tuberculosis or consumption, is a very common disease among people and among several species of our domestic animals, particularly cattle and swine. It is also found, although comparatively rarely, among other species of the domestic animals. In some places fowls are frequently found that are afflicted with this disease. For a long time it was thought that it might have been acquired through eating the expectorations of tuberculous animals or man, or feeding upon tuberculous organs of slaughtered animals, but recent investigations have made it practically certain that tuberculosis of fowls is not the same disease as tuberculosis of the higher animals, and although these are similar it is caused by a somewhat different germ, and it is not probable that it is ever acquired from the higher animals nor that the higher animals can acquire tuberculosis from fowls. The principal symptoms of tuberculosis are those of a lingering illness that gradually becomes more severe. Sometimes, tubercles appear as hard and horny or as soft and cheesy swellings on the skin or about the joints. There is wasting, the comb and the membranes of the head become pale, the strength of the fowl is gradually lost and finally it dies, after having shrunken to a mere mass of bones, skin and feathers.

After death, little white or yellow tubercles which contain cheesy matter may be found in the liver and spleen. About half of the fatal cases of tuberculosis in birds show tubercles, which appear as rather dense round masses, in the walls of intestine. They may also be found in some cases in the peritoneum, the membrane lining the abdominal cavity, and in the lungs. Many of the birds in Zoological Gardens die of tuberculosis, and it is very common among cage birds. A number of cases in parrots have been seen at the Veterinary Hospital of the University of Pennsylvania. Tuberculosis of parrots differs somewhat from that of chickens, in that it may be caused by a germ identical with that causing tuberculosis of man, and may be derived from or transmitted to people. So that tuberculous parrots are a menace to human health.

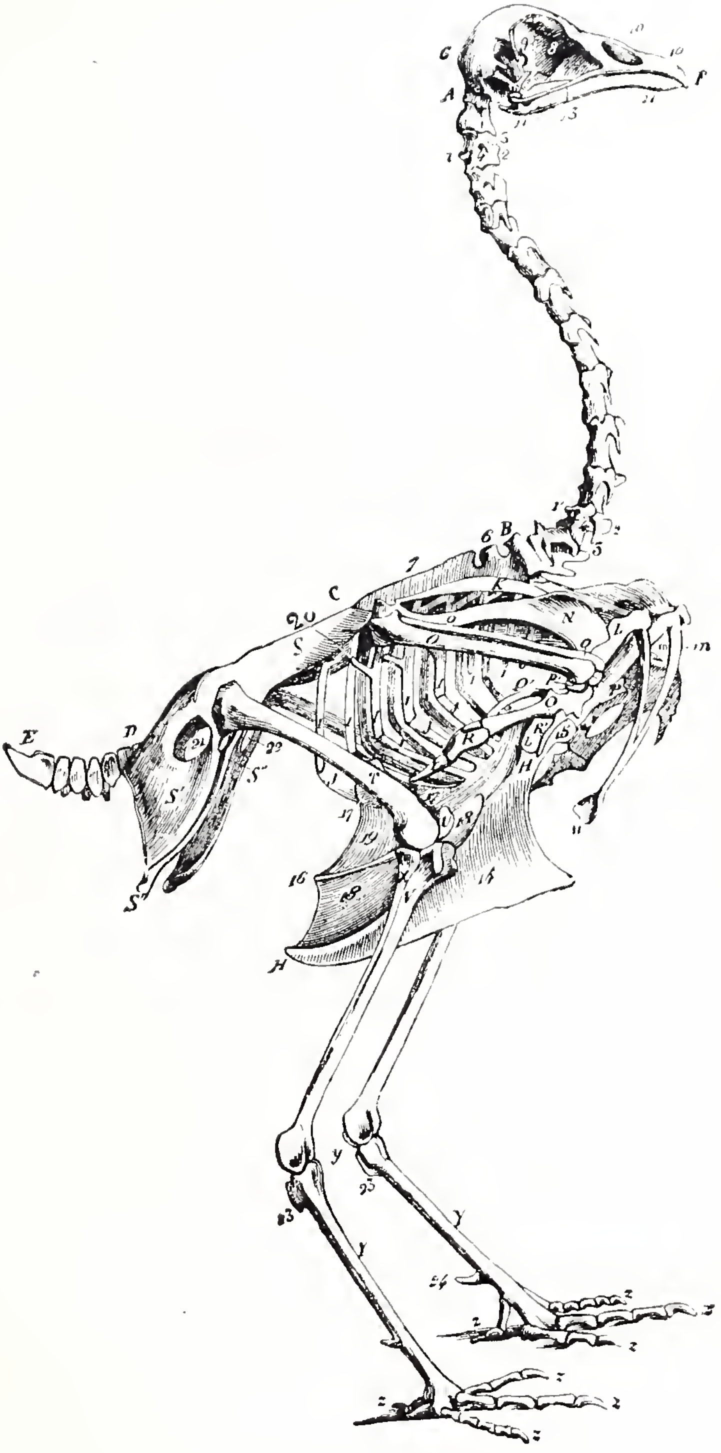
There is no cure for tuberculosis, and the most efficient means of preventing it consists in killing and burning fowls that may be suffering with it and thoroughly disinfecting the premises previously occupied by them.

5. GOING LIGHT.

Pigeon fanciers speak of a disease of pigeons known as "going light," which means that the diseased birds are becoming lighter and thinner or, in other words, wasting away. The designation is applied so generally and loosely that it has not been possible to attach a definite meaning to it or discover that it relates to a single disease. An outbreak of disease among pigeons has been studied by Dr. Moore, who found that a rather chronic wasting disease was produced by a germ that in some respects resembled the germ that causes hog cholera. "Going light" might be defined in many cases as a chronic, wasting disease of pigeons, that is due to a cause that is unknown, but which is probably of an infectious nature. In some of the outbreaks, the disease runs a much more rapid course than in others, and causes death within a few days. In other cases, its course is quite prolonged and the bird sometimes recovers. If treatment is employed it should consist in the administration of general tonics, such as quinine, in one grain doses twice a day; cod liver oil, one-half teaspoonful, 3 or 4 times daily; reduced iron in the food. Warm, well ventilated, comfortable surroundings, and nourishing and attractive food must be provided. The pigeon loft should be thoroughly cleansed and disinfected in reference to this affection, and if pigeon fanciers will notify the State Veterinarian when outbreaks appear they will be investigated with a view of discovering the exact cause and the measures to be taken to cure or prevent it.

Description of Opposite Plate.

From A to B, cervical vertebrae. 1, spinous process of the third vertebra; 2, inferior ridge on body of the same; 3, styloid prolongation of the transverse process of the same; 4, vertebral foramen of the same; 1′, 2′, 3′, 4′, the same parts in the twelfth vertebra. From B to C, dorsal vertebrae; 6,spinous process of the first; 7, crest formed by the union of the other spinous processes. From D to E, coccygeal vertebrae. F, G, head; 8, interorbital septum; 9, foramen of communication between the two orbits; 10, premaxillary bone; 10′, external openings of the nose; 11, maxilla; 12, os quadratum; 13, malar bone. H, sternum; 14, brisket or keel; 15, episternal process; 16, internal lateral process; 17, lateral external process; 18, membrane which closes the internal notch; 19, membrane of the external notch. I, etc., superior ribs, 20, posterior process of the fifth; J, inferior ribs; K, scapula; L, Coracoid bone; M, forculum—m. m. its two branches; N, humerus; O, ulna—o, radius; P, P′, bones of carpus; Q, Q′, bones of metacarpus; R, first phalanx of the large diget of the wing, r, second phalanx of the same; R, phalanx of thumb; S, ilium, s′, ischium, s′′, pubis, 21, sciatic foramen, 22, foramen ovale; T, femur; U, patella; V, tibia, x, fibula, y, single bone of tarsus; Y, metatarsus, 23, superior process representing a united metatarsal bone, 24, process supporting the claw; z, etc., digits.—Chauveau.

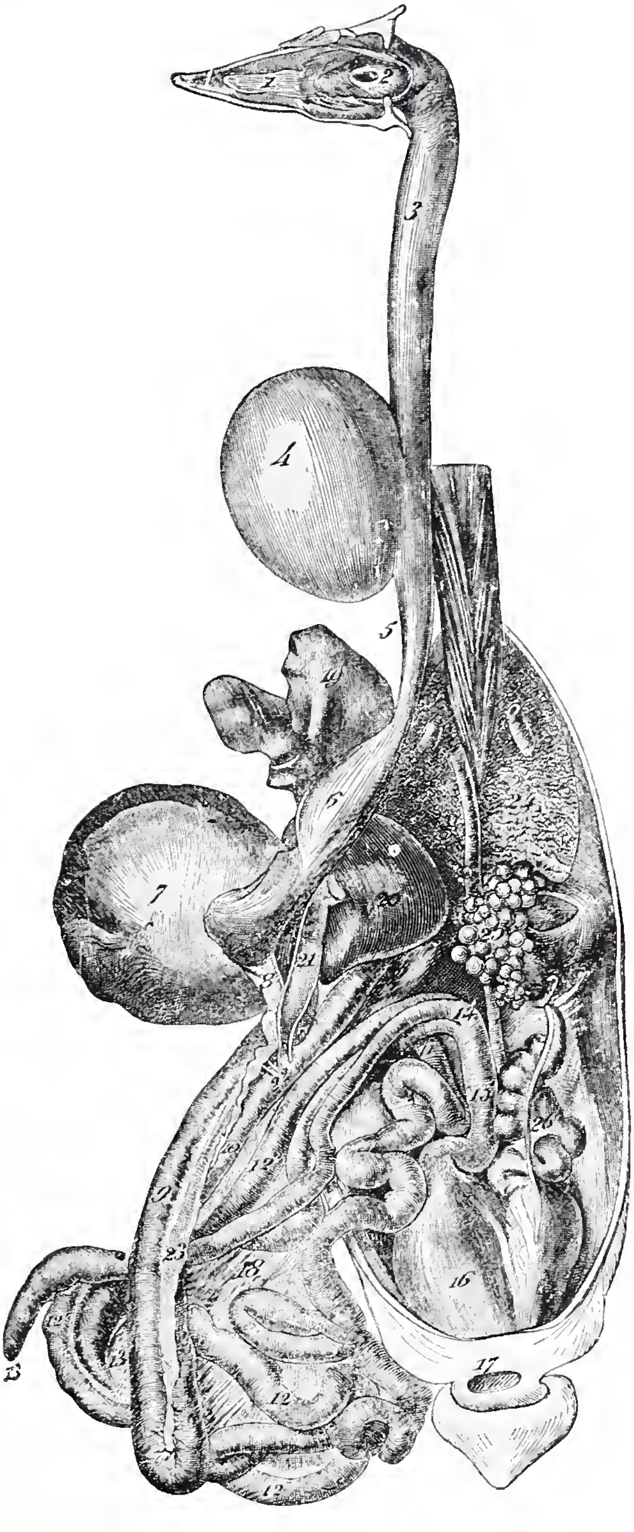


SKELETON OF A FOWL.

Description of Opposite Plate.

The abdominal muscles have been removed, as well as the sternum, heart, trachea, the greater portion of the neck, and all the head except the lower jaw, which has been turned aside to show the tongue, the pharnynx and the entrance to the larynx. The left lobe of the liver, succentric ventricle, gizzard and intestinal mass, have been pushed to the right to exhibit the different portions of the alimentary canal and to expose the ovary and oviduct.

1, tongue; 2, pharynx; 3, first portion of the oesophagus; 4, crop; 5, second portion of the oesophagus; 6, succentric ventricle; 7, gizzard; 8, origin of the duodenum; 9, first branch of the duodenal flexture; 10, second branch of the same; 11, origin of the floating portion of the small intestine; 12, small intestine; 12′, terminal portion of this intestine, flanked on each side by the two caeca; 13, free extremities of the caeca; 14, insertion of these two organs into the intestinal tube; 15, rectum; 16, cloaca; 17, anus; 18, mesentary; 19, left lobe of the liver; 20, right lobe; 21, gall-bladder; 22, insertion of the pancreatic and biliary ducts; 23, pancreas; 24, lung; 25, ovary (in a state of atrophy); 26, oviduct.—Chauveau.



GENERAL VIEW OF THE DIGESTIVE APPARATUS OF A FOWL.

PART II.

A PRELIMINARY REPORT CONCERNING Some Furred and Feathered Enemies of Domestic Fowls.

By B. H. WARREN, M. D., Zoologist.

INTRODUCTORY NOTES.

It is estimated that the value of poultry of all kinds and the eggs produced in Pennsylvania is at the present time about $22,000,000. From this it will be seen that the industry is an important one. It is a well established fact that when proper care and attention are devoted to the raising of poultry, the enterprise pays well for the amount of money invested.

Reports received by this Deparment from farmers and poultry raisers throughout the Commonwealth show that the loss annually incurred to domestic fowls from the visits of predatory birds and mammals is considerable.

Annual Loss.

From the insufficient data at our command it is at this time impossible to give an accurate estimate of the loss annually incurred by animals, both furred and feathered, destroying poultry and their eggs. It is claimed by some that the damage done in this State is annually not less than $750,000. This estimate, however is probably too high. Basing our opinion on returns to this Department, made by farmers and poulterers throughout Pennsylvania, we would estimate that the loss sustained yearly, through the ravages of the animals above indicated is certainly not less than $250,000.

LEARN TO RECOGNIZE YOUR FRIENDS AND FOES.

There is no question that the money loss in the aggregate is very great and that a better understanding of the true economic relations of many of our common birds and mammals is of particular importance to farmers as well as to other of our citizens. There is unfortunately a large class of our inhabitants who entertain mistaken opinions concerning many of the familiar birds and mammals which inhabit their landed possessions, and as a natural result some of the most beneficial species are destroyed, simply, because it is supposed they are harmful; when on the other hand the intelligent investigations of economic zoologists have clearly shown them to be eminently beneficial to the tiller of the soil.

DON'T ADVOCATE UNWISE BOUNTY ACTS.

During the past ten or twelve years a large number of our citizens have urged our lawmakers to enact bounty or scalp acts, whereby premiums could be given for the destruction of different kinds of birds and other animals, which it was very generally supposed subsisted almost wholly on poultry and game of different varieties. Acts of Assembly in this direction were passed and it was soon demonstrated that after they were in active operation, that the loss occasioned by the killing of beneficial animals was much more harmful than otherwise. The marked increase of the destructive meadow mice, during the last five or six years in different sections of Pennsylvania is abundant evidence of the lack of wisdom of placing a bounty on the heads of hawks and owls which live principally on these troublesome rodents.

BIRDS AND MAMMALS AS A CLASS ARE BENEFICIAL.

There is, however, no doubt that certain species of birds and mammals are detrimental and their fondness for domestic fowls and game—both furred and feathered—as well as various kinds of small wild song birds is such that no one, who is acquainted with their true life-histories will attempt to defend them. The number (species) of poultry and game devouring animals dressed either in coats of light-weight feathers or of soft warm fur is small as compared with the species which are serviceable or neutral.

It is unwise to overlook the great benefits conferred by the majority of our birds and mammals in the cultivated field, meadow, forest and orchard, by destroying the troublesome rodents, and multitudes of insects, which, as Dr. Elliott Coues well says: "singly are insignificant, but collectively a scourge, which prey upon the hopes of the fruit grower, and which if undisturbed would bring his care to nought."

BIRDS OF PREY.

Nearly twenty different kinds of hawks, eagles and owls are found regularly in Pennsylvania, and of all the numerous species of bird-life occurring in this Commonwealth, few, if any, are better known to our people in general than are these birds, some of which are common at all times or during some period of the year, in almost every section of the State. Hawks and eagles generally build large nests of sticks, twigs, etc., on trees; some, however, nest on rocky ledges. The March hawk breeds on the ground and the little Sparrow hawk breeds in hollow trees.

THE EGGS.

The eggs, usually two to five in number, sometimes more, are generally spotted and blotched. They are never spherical and white, like the eggs of owls. The adult males are usually smaller than the females and with the exception of the marsh and sparrow hawks, are quite similar in color. The young or immature birds, of most species, differ greatly from the old. These birds catch their prey with their talons. Their cries are loud and harsh. Occasionally they are seen in flocks which sometimes contain several species and numerous individuals, but usually these birds are observed singly or in pairs.

THE OWL FAMILY.

Ten species of owls are attributed to the fauna of Pennsylvania. Some are common residents in all parts of the State; others breed in boreal regions and are found with us as irregular or accidental winter visitants. The little screech owl, dressed in his coat of red, or gray, or a mixture of both, is one of the most common and best known birds of this group. He is found in cities and towns as well as in the rural districts. In the hollow limbs of trees in old apple orchards he delights to conceal himself in daytime, and also to rear his family. He is often found about barns and other buildings where he goes in the daytime to hide, or frequently at night to catch mice, one of his main articles of livelihood. The Great Horned owl inhabits the woods, but on the approach of night he goes out in quest of food. His visits to the poultry yard are so common that he also is familiar to residents of the country, where he is usually known from his loud cries as "Hoot owl." The Barn owl, a southern bird, breeds sparingly and most frequently in the southern parts of our State. The Snowy, which rears its family in the Arctic wilds, is found here only as an irregular winter sojourner. Some persons not versed in ornithological matters, name both the Snowy owl and Barn owl "White" or "Snowy" owls. Such local names, used to designate the Barn owl, are confusing and should be discarded.

MICE DEVOURING SPECIES.

Owls, other than the long-eared and short-eared species, are usually observed singly; those that breed here, of course, are often during the breeding period seen in pairs and with their young. In winter long-eared and short-eared owls are found generally in flocks. Long-eared owls breed in many localities, in fact quite generally throughout the State, and owing to the circumstances that sometimes they roost, in the daytime, in cedar trees, they are termed by many "Cedar" owls. The Short-eared owls frequent meadows, swamps and grassy fields. Hunters who most frequently come across these birds in the fall and winter time know them as "marsh" or "swamp" owls. The Short-eared owl is common in winter and is said to breed here in rare instances. Both the Long and Short-eared owls should be protected by the farmer and fruit grower, as these birds live almost exclusively on mice.

THE BARRED OR "RAIN" OWL.

The Barred owl is a resident and breeds generally throughout the State; it is most numerous in the mountainous and wooded districts. In different parts of Wayne, Susquehanna and Wyoming counties, where four or five years ago the Barred owl was very common, it is called "Rain" owl, as it was asserted its dismal cry was most frequently heard before a storm. To distinguish an owl from a hawk remember the owl's eyes are situated in the front of the head and look forward, while the hawk's eyes are directed to either side. The extremely soft and downy plumage of owls is such that their flight is almost noiseless. During the daylight we usually find them concealed in hollow trees or dense foliage. While it is generally an accepted fact that owls are nocturnal in their habits it is not true that they are exclusively so. The Short-eared and Barred owls are of a decidedly diurnal nature, and in cloudy weather or in early twilight it is not unusual to see the Great Horned owl sally forth in quest of prey.

FOOD OF OWLS.

Owls, unlike certain other birds of prey, never, it is stated, unless reduced to the utmost extremity, feed on carrion, but subsist on such food as they are able to kill. Their dietary, although variable with locality and circumstances, consists mainly of small quadrupeds (principally mice), insects, chiefly beetles and grass hoppers and some few of the smaller kinds of wild birds. With the exception of the Great Horned owl and perhaps the Barred, all the owls occurring regularly in this Commonwealth deserve the fullest protection which can be given to them by the farmer and horticulturist.

The owls, like many other birds of prey, eject from the mouth in small ball-like masses, the indigestible portions of their food, such as hair, bones, etc. These little balls or pellets are frequently to be found in great quantities about localities where these birds resort during the daytime. The eggs are white, nearly round, and commonly number from three to five. The owls deposit their eggs generally in hollow trees or the deserted nests of hawks and crows.

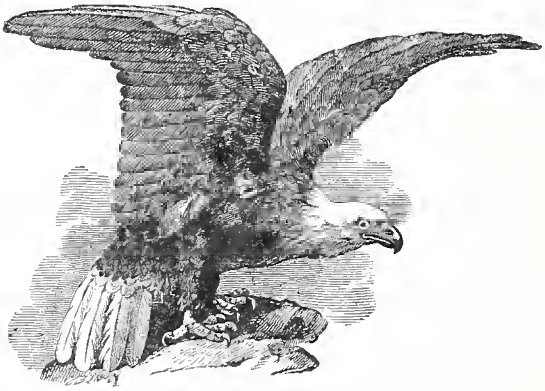
DETRIMENTAL SPECIES.

The Cooper's and Sharp-shinned hawks and the Great Horned owl are the three representatives of the feathered tribe, which commit the greatest amount of damage to domestic fowls and to game of different kinds. Other species, such as the Eagles, the Goshawk and Duck hawk are also destroyers of poultry, etc., but none of these rapacious birds are sufficiently numerous in this Commonwealth, to do any very great amount of injury.

CHAPTER IX.

The Eagles.

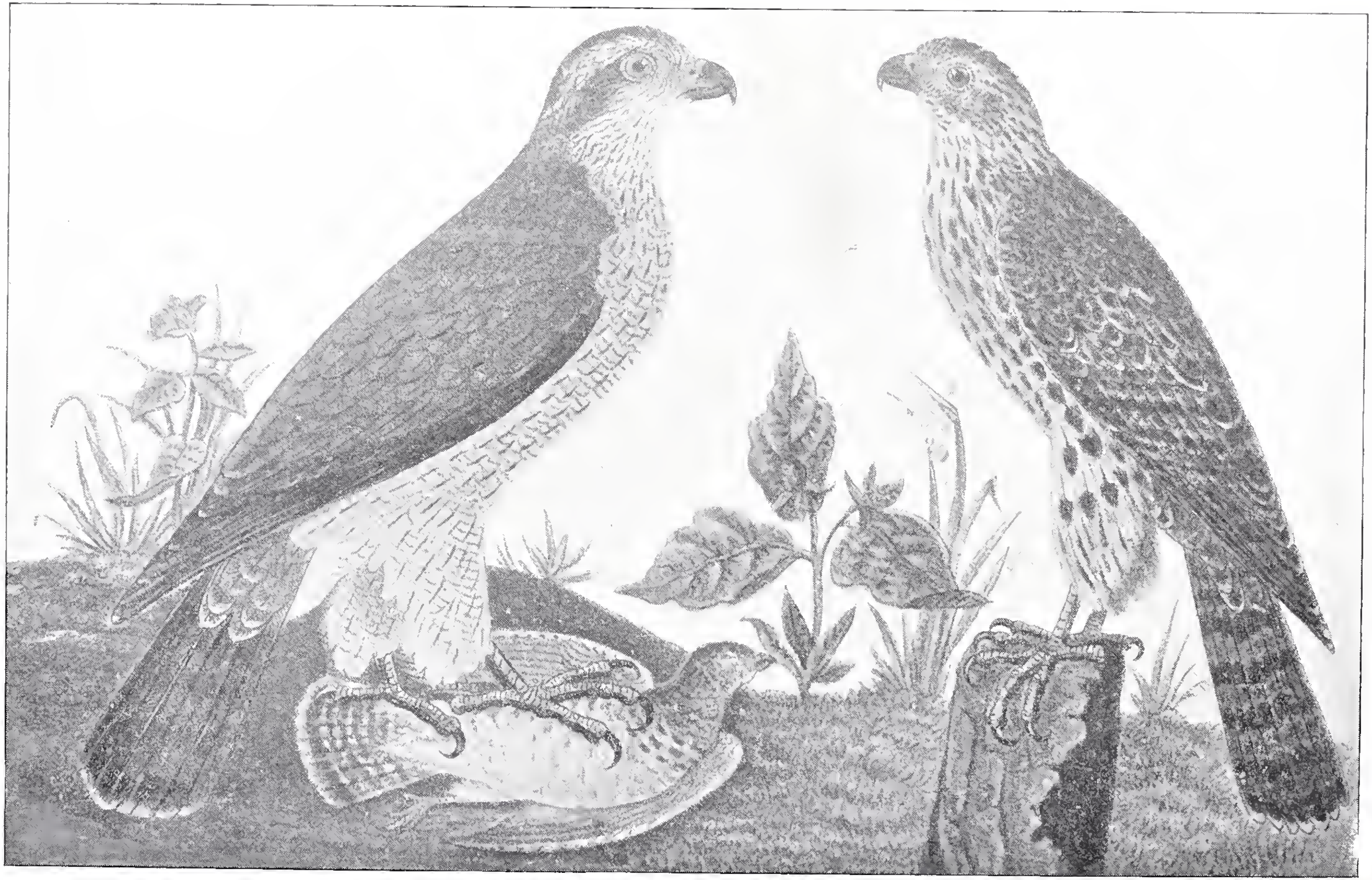
Two species of eagles are found in Pennsylvania. The Bald Eagle breeds sparingly in the State. The Golden Eagle occurs as a winter visitor. Neither species is common; but of the two the Bald is much more frequently met with than the Golden. Both of these birds will destroy poultry, wild turkeys, grouse, hares and other smaller sized quadrupeds. Lambs and young pigs are sometimes captured by them, but the damage done to live stock of this kind in this region is very small. The Bald Eagle has, it is said, been known to attack young fawns, but such instances are of rare occurrence. The damage done by eagles in Pennsylvania is not of any special importance.



BALD EAGLE.

Goshawk.

The Goshawk is not common in this State. Usually this fierce, powerful and predatory bird confines himself to the mountainous and heavily wooded regions. It is rather exceptional for these birds to be found in the populous farming districts and when they are seen in such places it is generally during severe winters, when their favorite mountain retreats are visited by heavy falls of snow. The Goshawk is a regular breeder on North mountain, Sullivan county, Pa. I have seen birds of this species in Clinton and Centre counties of this State in June and July, hence am inclined to think they may also breed in these counties. Messrs. Otto and Herman Behr of



GOSHAWK.

Lopez, Pa., have found, during the last five or six years, several nests of these hawks on North mountain. Within a radius of four or five miles of their home at least three or four pairs of these birds have bred regularly for many years.

THE NEST.

In the latter part of May of this present year Mr. Herman Behr found the nest of a Goshawk about three miles from his home; it contained three young birds. The nest was a very bulky structure, probably not less than three feet high by three feet in diameter, and made up almost entirely of sticks. It was built on a large beech tree.

GOSHAWKS AND WILD PIGEONS.

Mr. Behr informs me that some thirty-five years ago there was a wild pigeon roost or breeding ground fully seven miles square, on North mountain, which was annually resorted to by these birds every spring. On one occasion Mr. Behr counted forty-six pigeons' nests on a single beech tree. Wild pigeons, until within the last three years bred regularly in small numbers on the North mountain. The last wild pigeons observed in that region by Messrs. Otto and Herman Behr was taken in the spring of 1893. The Goshawk also the Cooper's and Sharp-shinned species in common with the Great Horned and Barred owls destroyed great numbers of pigeons. Of all these raptorial birds the cruel, daring and blood-thirsty Goshawk was by far the most persistent and destructive enemy to the pigeons.

The owls, like other nocturnal marauders, such as the wild cat or bay lynx, the red fox, the mink and agile weasel, all preyed upon the pigeons. The weasels would frequently climb the tree to get the pigeons eggs and young, or often to capture the old birds when at rest. The other mammals previously mentioned, depended, mostly on catching squabs which fell from the nests.

WHAT GOSHAWKS PREY UPON.

The Goshawk feeds upon chickens, turkeys, ducks, grouse, quail, robins, hares and squirrels and other small rodents. Although at times this bird is very destructive to poultry the greatest damage done by this species in this State appears to be to game, especially grouse.

The following paragraphs concerning this daring and destructive hawk are taken from Dr. A. K. Fisher's Report, Bulletin No. 3, entitled "The Hawks and Owls of the United States." This species is one of the most daring of all the hawks, and while in pursuit of its prey is apparently less concerned by the presence of man than any other. It will dart down unexpectedly at the very feet of the farmer and carry off a fowl. The following from the pen of the late Dr. William Wood gives evidence of its boldness:

THE DESTRUCTION OF POULTRY.

"The Goshawk is the most daring and venturesome of any of our diurnal birds of prey. A farmer who resides a few miles from my office, wishing to perpetuate the old New England custom of having a chicken pie for Thanksgiving dinner, caught some fowls, took them to a log, severed the neck of one, and threw it down beside him. In an instant the Goshawk seized the struggling fowl, and, flying off some ten rods, alighted and commenced devouring his prey. The boldness of the attack so astonished the farmer that he looked on with blank amazement. Recovering from his surprise, he hastened into the house and brought out his gun, which secured him both the hawk and the fowl. Another instance of still greater daring occurred near East Windsor Hill, Connecticut. A Goshawk flew after a fowl near a dwelling house; the door being open, the hen flew inside; the hawk followed, and seized her in the room occupied by an old gentleman and his daughter. The old man hastened to the rescue, and struck the hawk with a cane before it released its grasp. The daughter caught the hawk as it attempted to fly out of the door, and killed it." (Amer. Nat. Vol. X. 1876, p. 134.)

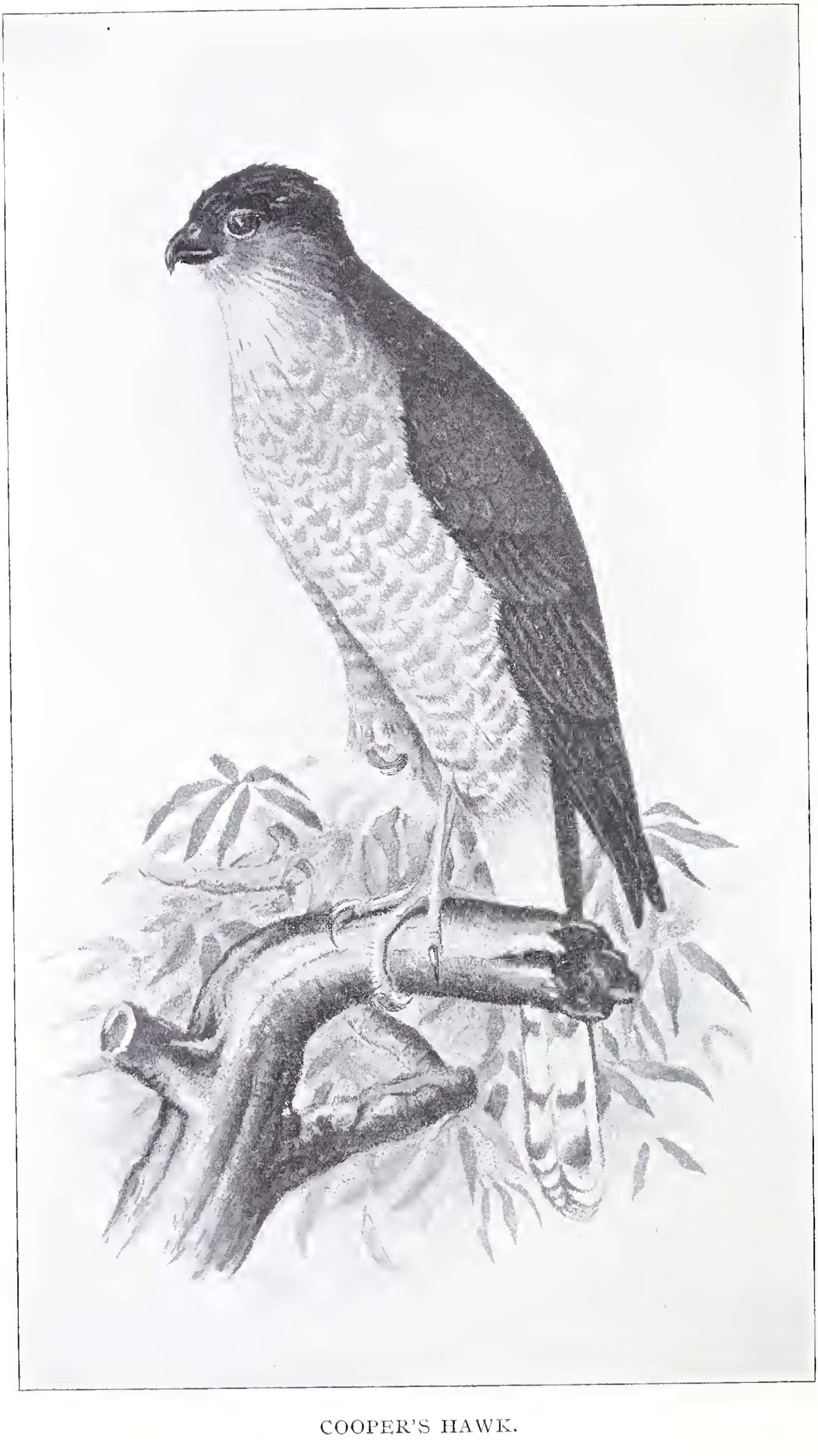
Capt. Charles E. Bendire informed the writer that at Fort Klamath, Oregon, he once shot at a Goshawk and slightly wounded it with fine shot, and in the course of a few minutes it returned and attacked a chicken. Numerous cases are on record where it has flown through windows to attack canaries or other cage birds.

AN ENEMY OF WILD FOWLS.

In the general character of its flight, as well as the mode of hunting and capturing its prey, it closely resembles Cooper's hawk, though it frequents the thick woods rather more than the latter bird. In the fall this hawk is common along the smaller water courses where it is very destructive to wild ducks and other water fowl, and is able to strike down a bird as large as a full grown mallard. If its prey is a bird of this size it rarely eats more than the flesh from the breast, leaving the rest of the carcass untouched. Scorning to feed upon carrion, another victim is secured when hunger returns.

A SUCCESSFUL GROUSE HUNTER.

Of the upland game birds the ptarmigan in the north and the ruffed grouse in the middle districts suffer severely from the attacks of this powerful hawk. Dr. William H. Dall, who found it common



COOPER'S HAWK.

in the valley of the Yukon river, states that it feeds largely on the white ptarmigan, the flocks of which it follows from place to place. E. W. Nelson and L. M. Turner both corroborate its destructiveness among these birds. In some parts of the country the Goshawk hunts the ruffed grouse so persistently that it is known by the name of "Partridge Hawk." and this bird probably has no worse enemy except man. As Audubon was passing down the Ohio he observed one of these hawks dive into a flock of grackles which was crossing the river, and kill four or five of them. After giving each victim a fatal squeeze the hawk allowed it to fall to the water and at the close of the chase returned and picked up all from the surface.

Cooper's Hawk.

The Cooper's Hawk, also known as the Long-tailed chicken or Pheasant Hawk is a common native. This species and its near relative the Sharp-shinned Hawk are the ones which probably do more damage to the poultry interests of Pennsylvania than all other of our hawks. Although this hawk is common during all seasons it is much more plentiful during the late spring, summer and early autumn than in midwinter. The Cooper's Hawk measures from eighteen to twenty inches in length, its extended wings measure about thirty-six inches, the long and rounded tail is about eight and one-half inches long. The adult male is a little smaller than the female, to which the above measurements refer. The adults have upper parts bluish-gray, top of head blackish; the tail has several blackish bars; below white; the breast and sides being barred with dusky or rufous." The immature birds are dusky above, more or less spotted with white and reddish brown; tail banded and lower parts white, with long brown spots.

The Nest and Eggs.

Nest building is commonly begun in this locality about the middle of April, and lasts for a period of from three to five days. Occasionally this bird will deposit its eggs in a deserted crow's nest. I believe they prefer to erect their own nests, and, from my observation, am quite positive they only appropriate the nests of other birds when their own have been destroyed. The building of the nest is the conjoint labor of both birds. It is usually built in a thick woods, and when a pair of Cooper's Hawks begin housekeeping in woodland near the farmer's poultry yard and they are not soon hunted up and killed or their nest and its contents destroyed, the chances are they will destroy a good many dollars worth of poultry before they and their young leave the locality.

Externally the nest is built of sticks varying much in size. It is generally lined with the inner layer of bark, although frequently, blades of grass, feathers and leaves enter into the construction of the interior. The eggs measure about 1.99x1.50 inches and usually number from three to four, although it is not a rare occurrence to find five. In color they are a dull, bluish white. Sets are sometimes taken with numerous and unevenly distributed brown and reddish spots.

The young leave the nest in about 25 days; when about 8 or 9 weeks old they are able to provide food for themselves; to this time, however, they are carefully guarded by the old birds and fed almost entirely on a diet of small wild birds, chickens and an occasional mammal and some insects.

An Audacious Poultry Thief.

While it is true the Cooper's hawk preys to a much greater extent on full grown poultry than does his daring little relative the Sharp-shinned hawk, there is no doubt that at times individual Cooper's hawks are equally as bad about destroying young poultry as are the Sharp-shinned hawks. For impudent daring this present species, without doubt, ranks pre-eminent among the raptorial genera. Almost every farmer or poultry raiser can give instances of where he or she was the victim of pillage by this bold and audacious robber. In the spring of 1878 the writer was presented by a friend with a Cooper's hawk which he had caught in a steel trap, but not until he and his mate had destroyed some fifty young chickens. In one day these two hawks killed twelve chickens.

A Bold Act.

Audubon says: "This marauder sometimes attacks birds far superior to itself in weight and sometimes possessed of a courage and strength equal to its own. As I was one morning observing the motions of some parakeets, near Brayon Sara, in Louisiana, in the month of November, I heard a cock crowing not far from me, and in sight of a farm house. The next moment the hawk flew past me and so close that I might have touched it with the barrel of my gun, had I been prepared. Not more than a few seconds elapsed before I heard the cackling of the hens and the war cry of the cock, and at the same time observed the hawk rising, as if without effort, a few yards in the air, and again falling toward the ground with the rapidity of lightning. I proceeded to the spot and found the hawk grappled to the body of the cock. I ran to secure the former, but the marauder had kept a hawk's eye upon me, and disengaging himself, rose in the air in full confidence. The next moment I pulled the trigger, and he fell dead."

A Varying Diet.

Dr. Coues (Birds of Northwest) says, in speaking of this hawk; "Possessed of spirit commensurate with its physical powers, it preys upon game little if any humbler than that of our more powerful falcons. It attacks and destroys hares, grouse, teal, and even the young of larger ducks * * * besides capturing the usual variety of smaller birds and quadrupeds. It occasionally seizes upon reptiles or picks up insects."

The following quotations from Dr. Fisher's Hawk and Owl Bulletin No. 3, page 39, show how extensively the Cooper's hawk feeds on game and domestic birds. Nuttall says: "His food appears principally to be of various kinds; from the sparrow to the ruffed grouse, all contribute to his rapacious appetite. * * * His depredations among domestic fowls are very destructive." (Land Birds, 1832, p. 90.)

Mr. H. Nehrling says: "This very common and impudent robber is the most destructive of the Raptores to the barnyard fowls; in a short time all the young chickens, turkeys and ducks are killed by it." (Bull. Nutt. Ornith. Club., Vol. VII, 82, p. 174.)

Mr. Thomas McIlwaith says: "This is one of the chicken hawks, and it well deserves the name, from the havoc it makes among the poultry." (Birds of Ontario, p. 137.)

Destroying Quail.

Mr. Henshaw informs me that the Cooper's hawk is very partial to quail's flesh in California, and the southern territories, and that it undoubtedly secures many victims. He once saw a young female dart into a bevy of Gambel's quail and seize one with the utmost ease, though the birds were flying at full speed. In an instant the flock scattered in every direction and sought refuge in the bushes, from which it proved next to impossible to dislodge them. They had recognized their enemy, and evidently knew that their only chance for safety lay in close hiding.

Feeds on Domestic Pigeons.

"Cooper's hawk is very destructive to domestic pigeons, and when it finds a cote which is easy of approach, it is very troublesome. Mr. William C. Avery, of Greensboro,' Ala., informs us that during one year he killed and wounded at least a dozen of these hawks before the inroads among his doves ceased. Among the smaller birds, this hawk is very fond of meadow larks, robins, and flickers. The writer, on several occasions, has secured specimens in hot pursuit of the last-named bird, which gave expression to their alarm by loud and continued cries." (Dr. A. K. Fisher, Bull. No. 3, p. 38, 1893.)

Destroys Pheasants and Other Game.

The common name of "Long-tailed Pheasant Hawk," by which the swift-winged plunderer is best known in the mountainous and sparsely settled regions is given because of the great damage this hawk does by destroying ruffed grouse. For several years past the writer has every season visited different localities in Pennsylvania, for the purpose of hunting ruffed grouse or pheasant, and from personal observation is well aware that the Cooper's hawk is a most destructive foe of this noble game bird. Hunters and woodsmen have often told me that these "pheasant hawks," referring to both the Cooper's and Sharp-shinned, kill almost as many birds as the average sportsman, and judging from the way in which a good many sportsmen "shoot" when they are in the brush after the wily grouse it is very likely that this statement is correct.

The Cooper's hawk feeds upon the gray rabbit (common cotton-tail) and the mountain jack or white rabbit (varying hare), squirrels are occasionally killed and young wild turkeys also suffer considerably from the attacks of this bird. Besides destroying poultry and game of different kinds, these hawks annually kill great numbers of small wild birds, such as woodpeckers, sparrows, thrushes, etc. The Cooper's Hawk has been known to kill and feed upon the following species of birds and mammals which are present in this State:

Birds.

Ruffed Grouse,
Quail,
Common Dove,
Goldfinch,
Robin,
Shore-lark,
Tree Sparrow,
Towhee,
Red-winged Blackbird,
Wild Turkey,
Wood Duck,
Yellow-billed Cuckoo,
Meadow Lark,
Screech Owl,
Flicker,
Red-headed Woodpecker,
White-breasted Nuthatch,
Song Sparrow,
Crow Blackbird,
Snowbird,
Field Sparrow,
Savanna Sparrow,
Blue Bird,
English Sparrow.

Mammals.

Opossum,
Gray Rabbit,
Varying Hare,
Field Mice,
Chipmunk,
Red Squirrel,
Common Rat,
Woodchuck (young).

The stomach contents of 43 Cooper's Hawks examined by the writer gave the following results: 18, chickens and pheasants; 12, small birds, sparrows, warblers, meadow larks, woodpeckers, thrushes; 3, quails; 2, doves or domestic pigeons; 1, bull-frog; 3, mice, rats and insects; 1, opossum; 1, young woodchuck and remains of wood duck; 2, hare and other remains of small quadrupeds.

SHARP-SHINNED HAWK.

The Sharp-shinned Hawk bears a close resemblance to the Cooper's Hawk, but it can be distinguished from the latter by its smaller size and the end of the tail which is straight or slightly notched. The tip of the Cooper's Hawk's tail is decidedly rounded. Length 10 to 14 inches; extended wings 21 to 26.

Adult: Upper parts bluish gray, top of head darker, tail crossed with several blackish bands; lower parts white; breast and sides with dusky or reddish bars. In immature birds the upper parts are dusky more or less spotted with lighter, and under parts are whitish with blackish streaks.

NESTS AND EGGS.

This extremely daring and spirited little hawk is one of the most abundant of our North American species. It is found in Pennsylvania as a resident, but during the spring and fall migrations—March, April, September and October, it is much more plentiful than at other periods. The nests in this locality, according to my experience, are mostly built in low trees and are made up almost entirely of small twigs. The eggs, mostly five in number, are nearly spherical, white or bluish white, marked with large and irregular splashes or blotches of brown, and measures about 1.46 by 1.16 inches. This hawk occasionally feeds upon insects, mice and reptiles, but the greater portion of its food consists of wild birds and poultry, particularly young poultry.

When a pair of Sharp-shinned or Cooper's Hawks nest in the neighborhood of a farm, where young chickens can be readily captured, they, if not speedily killed, will visit the place almost daily until the young chicks have all been destroyed, and if the hawks are not molested after a few visits to the coops, they seem to become more bold and daring every day.

FOND OF YOUNG CHICKENS.

Nuttall, writing of the Sharp-shinned Hawk says: "In thinly settled districts this hawk seems to abound and proves extremely destructive to young chickens, a single bird having been known regularly to come every day until he had carried away between twenty and thirty." The same writer says he was one day conversing with a planter, when one of these hawks came down and without any ceremony or heeding the loud cries of the housewife, who most reluctantly witnessed the robbery, snatched away a chicken directly before them.

POULTRY AND GAME DESTROYED.

This hawk does not by any means devote his attention exclusively to young poultry when he comes about the farm yard, but often may be seen to attack and kill chickens when two-thirds or full grown. Pheasants or ruffed grouse, both old and young, also quail, are destroyed in considerable numbers by Sharp-shinned Hawks. Young rabbits and squirrels are occasionally captured by these hawks, and on one occasion a few years ago a hunter of my acquaintance shot and presented to me a pair of these hawks which had killed several wild turkeys, which he said were about one-third grown. I have known both the Sharp-shinned and Cooper's Hawks, which had probably been watching coveys of quail, to suddenly swoop down and seize quail which had been shot by gunners, when the sportsman was only a few yards from the quail he had killed or wounded. Doves, which in recent years or since the wild pigeons have disappeared from this region, are eagerly sought after by sportsmen in many sections of the State, are very often destroyed by these hawks; they also sometimes attack the domestic pigeons, and they destroy many meadow larks and thrushes.

Dr. A. K. Fisher, assistant ornithologist, United States Department of Agriculture, in his admirable bulletin No. 3, on the Hawks and Owls of the United States, very properly says: "Little can be said in favor of this hawk, although its daring, courage and impudence are to be admired. On this and the two following species (Cooper's Hawk and Goshawk) mainly rests the responsibility for the ill-favor with which the other hawks are regarded. A score of valuable species suffer because they belong to a class which include two or three noxious kinds. However, like most villians, it has at least one redeeming quality, and that is its fondness for the English sparrow, our imported bird nuisance."

BIRDS DESTROYED.

The Sharp-shinned Hawk is known to kill and feed upon the following species of small wild birds which are common in this State:

Meadow Lark,
Common Robin,
Crow Blackbird,
Cow Blackbird,
Blue Bird,
Flicker,
Downy Woodpecker,
Goldfinch,
Savanna Sparrow,
Baltimore Oriole,
Chickadee,
Hermit Thrush,

Red Eyed Vireo,
Black Throated Green Warbler,
Red-winged Blackbird,
Red-headed Woodpecker,
Cat Bird,
English Sparrow,
Song Sparrow,
Tree Sparrow,
Snow bird,
Fox Sparrow,
Chipping Sparrow,
Orchard Oriole,
White-throated Sparrow,
Brown Thrush,
Myrtle Warbler,
Common Pewee,
Oven Bird.

This list could be considerably enlarged, as there are many other kinds of birds which different observers have identified among the stomach contents of this hawk. The list, is, however, sufficiently large to give the general reader a very clear idea that the Sharp-shinned is ever ready to capture and prey upon almost any bird he can master. The stomach contents of twenty-seven Sharp-shinned Hawks examined by the writer, are given in the following table:

DATE.	Locality.	Food Materials.
September 7, 1878,	Chester county, Pa.,	Song sparrow.
September 14, 1878,	Chester county, Pa.,	Quail.
November 20, 1878,	Newark, Delaware,	Chicken.
November 17, 1879,	Chester county, Pa.,	Snowbird.
May 3, 1879,	Chester county, Pa.,	Field mice.
September 10, 1879.	Chester county, Pa.,	English sparrows and field mice.
May 30, 1880,	Delaware county, Pa.,	Chicken.
June 2, 1880,	Chester county, Pa.,	Chicken.
June 3, 1880,	Chester county, Pa.,	Chicken.
August 23, 1881,	Chester county, Pa.,	Grasshoppers and beetles.
October 16, 1881,	Chester county, Pa.,	Quail.
October 29, 1881,	Chester county, Pa.,	Quail and fragments of beetles.
June 22, 1881,	Lancaster county, Pa.,	Chicken.
October, 1881,	Chester county, Pa.,	Meadow lark.
May 23, 1882,	York county, Pa.,	Warbler.
December 13, 1882,	Chester county, Pa.,	Song sparrow.
April 3, 1882,	Chester county, Pa.,	Robin.
September 20, 1884,	Chester county, Pa.,	Field sparrow.
October 3, 1886,	Chester county, Pa.,	English sparrow.
November 26, 1886,	Chester county, Pa.,	Song sparrow and fox sparrow.
August 15, 1887,	Lycoming county, Pa.,	Mourning dove.
September 19, 1887,	Dauphin county, Pa.,	Ruffed grouse.
November 17, 1887,	Delaware county, Pa.,	Common pigeon, chickadee.
June 20, 1888,	Lackawana conunty, Pa.,	Red-eyed vireo and chicken.
October 1, 1890,	McKean county, Pa.,	Downey woodpecker and snowbird.
August 27, 1891,	Chester county, Pa.,	Brown thrush and beetles.
December 10, 1885,	Luzerne county, Pa.,	Field mice and English sparrow.

Dr. Fisher's report (Bulletin No. 3), previously referred to, gives the following summary of 159 stomachs of Sharp-shinned Hawks taken in different sections of the United States, from September 10, 1885, to August 10, 1891: "Of 159 stomachs examined, 6 contained poultry or game birds; 99, other birds; 6, mice; 5, insects, and 52 were empty." These investigations show very conclusively that the species under consideration is an enemy of the poultry raiser, the farmer, fruit grower and sportsman.

GREAT HORNED OWL.

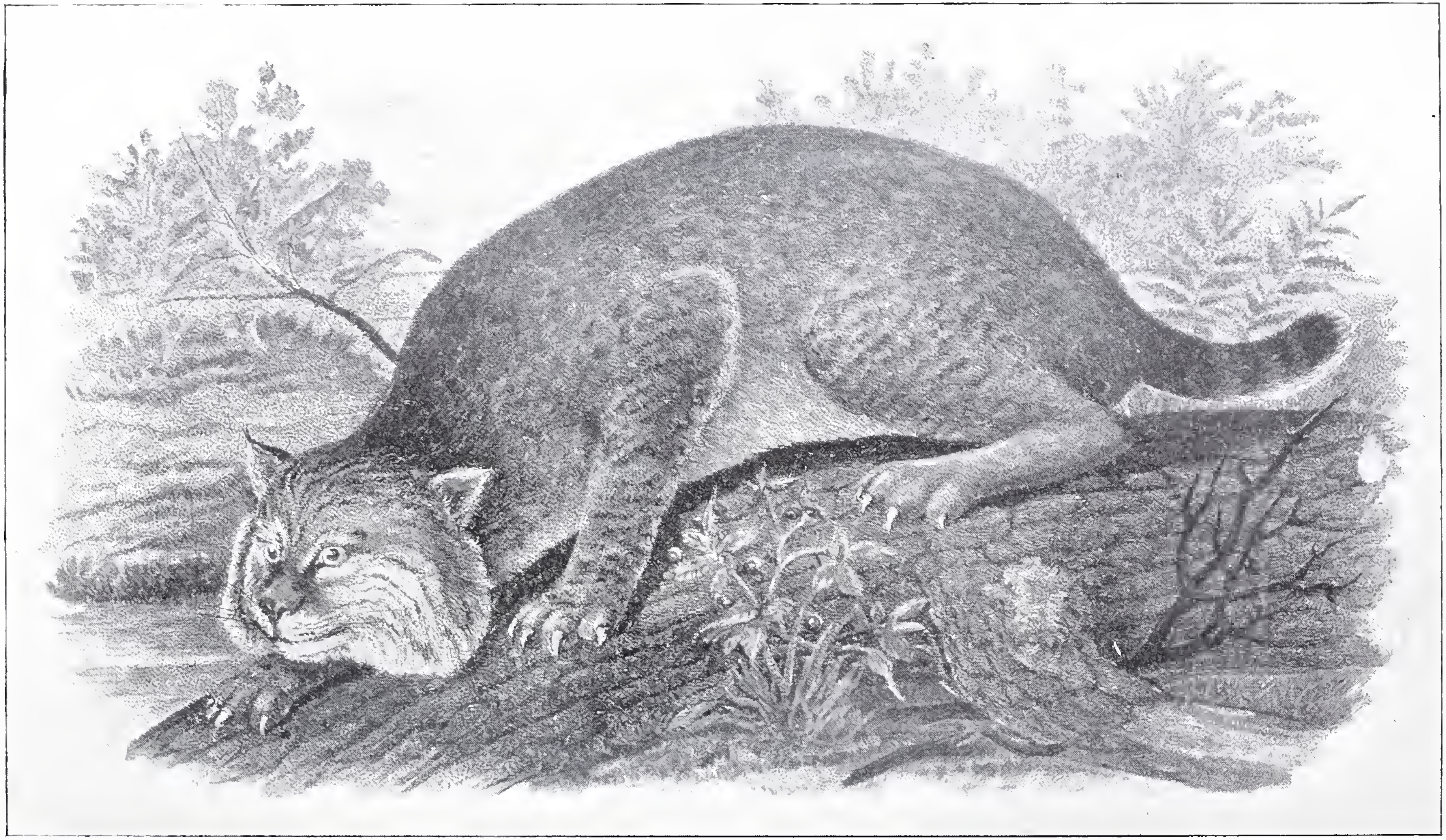
This big, yellow-eyed and brown-coated bird, with long ear-tufts that measure two and a half inches in length, is the largest of all our native owls. The species is the first of our rapacious birds to begin housekeeping. In this locality the eggs, are, I think, usually laid in February. Sometimes this owl builds its own nest, but commonly its eggs or young are to be found in old nests of hawks or crows, which have been remodeled with leaves, sticks, feathers and grass. The number of eggs in a set is, as rule, two; occasionally it is said three or four have been taken from one nest. No species of the owl family is better known to farmers, poultry raisers and sportsmen than is this one. The common names by which this bird is best known in many sections of the State are Big "Hoot Owl and "Cat" Owl.

LOVES POULTRY.

The Great Horned Owl, like the Cooper's Hawk, is a deadly foe to poultry. His raids among domestic fowls of all kinds are well known to almost every farmer.

DESTROYS GAME.

Many of the wild birds, even the smaller kinds of owls, are destroyed by this nocturnal depredator and different species of mammals eaten. In this Commonwealth, from our own personal observations, as well as from reports of correspondents, the game which is preyed upon to the greatest extent by this owl includes ruffed grouse, rabbits and wild turkeys. The damage done to ruffed grouse and rabbits is unquestionably very considerable in the course of a year.



BAY LYNX OR WILD CAT.

CHAPTER X.

WILD CAT.

The majority of hunters and woodsmen who reside in sections of Pennsylvania where the Wild Cat or Bay Lynx occurs, have various local names for this wary and prowling animal. The appellations, Bob-cat, Catamount, Mountain Cat and Tiger Cat, are perhaps the ones which are most frequently employed.

CATAMOUNT.

From repeated interviews with hunters and woodsmen it is learned that the catamount is very generally believed to be a wholly different species from the wild cat. However, on questioning these persons closely, I find the size is about the only distinctive point they can call to mind to support their claim, and all large sized cats are denominated "Catamounts," and on the other hand, the smaller ones are termed wild or "bob" cats.

ACQUIRE MORE KNOWLEDGE.

The indiscriminate employment of local names to distinguish many of our birds and mammals oftentimes leads to much confusion, but until the great mass of our citizens become better acquainted with the furred and feathered inhabitants such errors are bound to occur. In this connection it may be stated that through the wise efforts of our progressive and intelligent State Superintendent of Public Instruction, Dr. N. C. Scheaffer, and his able assistants, much good work has been done to create a popular interest in zoological study throughout the common schools of the State. If Dr. Schaeffer's ideas are carried out as they should and doubtless will be, the time will soon come when our school children will be readily able to recognize and speak intelligently of, at least, the common birds and mammals which they see about the parks and gardens, in the fields or meadows, on the rugged mountain side, in the shady forest, or along the river bank.

THE WILD CAT'S FAVORITE HAUNTS.

The Wildcat inhabits forests, rocky ledges and briary thickets, but its favorite place is in old slashings and bark peelings, where in the impenetrable and tangled recesses it is comparitively safe from pursuit, and is also able to prey upon many varieties of animals which have a permanent or temporary residence in such unfrequented wilds.

There are large tracts of land in the mountainous districts of Pennsylvania from which the marketable forest trees have long since been cut off. These places, called slashings and bark peelings, in many instances are thickly strewn with decaying logs, fallen trees, that were cut down for the bark, brush piles, tree tops, and so overgrown with bushes, young trees, briars, and frequently large patches of buck laurel (rhododendron) as to be almost impassible unless one selects the old log roadways which traverse such areas. In these places rabbits and other quadrupeds, pheasants and many different kinds of small birds find an excellent cover.

Wild Cats Increasing in Some Counties.

Through my own personal observations in the field and also from the statements of thoroughly trustworthy hunters, trappers and lumbermen I am of the opinion that this species has been increasing during the last three or four years in several of our counties, namely, Elk, Clearfield, Cameron, Centre and McKean, where large districts have been denuded of their forest trees.

The Wildcat subsists entirely on a flesh diet, and the damage this species does in destroying poultry, lambs and young pigs of farmers who reside in the sparsely settled mountainous regions is not in any degree compensated by the destruction of other small wild animals which molest the farmers' crops or his poultry.

They Pursue and Kill Deer.

Wildcats are very detrimental to game. They unquestionably kill many young deer and they also not infrequently, it is said, attack and kill the adult deer. United States District Attorney, Hon. H. A. Hall, of Pittsburgh, informs me that at St. Mary's, Elk county, where Messrs. Andrew Kaul and J. K. P. Hall own a game preserve of probably 650 acres, in which are confined a large number of deer, there is much trouble experienced from the Wildcats disturbing the deer. Mr. Hall further states that small bands (probably families) of these carnivorous animals, in the winter when snow is on the ground, sometimes pursue, like dogs, full grown deer, which they run down and kill.

Many Kinds of Birds Slain.

One of the few, in fact about the only species of game bird that is at all numerous, which the sportsman can go in quest of in this Commonwealth without almost continually coming in contact with trespass notices warning him to "keep off the grass" is the ruffed grouse or pheasant, and unfortunately the favorite haunts of this noble game bird are in localities where the Wildcat loves to sneak, hide and depredate. The cautious and ravenous "cat" is passionately fond of grouse. He destroys them, both old and young, and also their eggs whenever an opportunity presents itself. He kills wild turkeys and sucks their eggs, it is affirmed, when ever a nest can be found. The number of small insectivorous and wild song birds that nest on the ground or in low bushes, which he destroys during the summer season, about the slashings and abandoned lumber camps is no doubt considerable.

MAMMALS EGGS, ETC., ARE DEVOURED.

Rabbits, squirrels, mice and skunks are also eaten by Wildcats, and in the southern states Audubon says they visit sometimes "the dry beds of streams or brooks to pick up the catfish, etc., or crayfish and frogs that remain in the deep holes of the creeks during the drought of summer." The same authority states that "the wildcat it a great destroyer of eggs, and never finds a nest of grouse or partridge, wild turkey or other bird without sucking every egg in it."

HUNTS THE QUILLFUL PORCUPINE.

About four years ago I spent ten days or two weeks in the winter in company with two hunters and trappers in Cameron and Elk counties. We secured nine wildcats, two with guns, and the remainder with steel traps, and on examining these animals I found that three of them were well filled with quills of the porcupine. This led me to infer that the Wildcat did not hesitate to attack an animal capable of making a pretty vigorous defense.

METHODS OF CATCHING GAME.

Wildcats hunt both by day and night, but like the great majority of thieves and murderers they appear to select the darkness as the most auspicious time to commit their deeds of violence. When a Wildcat discovers a flock of wild turkeys, pheasants or a rabbit running on the ground, he will follow them for some distance, and when he ascertains the direction in which they are going, will make a quick detour, and concealing himself behind a log, in the brush, or on a low branch of a tree, will hide and like an assassin, wait patiently until his prey comes within reach. I once, when hunting white rabbits in Cameron county, saw a Wildcat run into a clump of laurel and lie in ambush until a rabbit which he had been chasing approached within springing distance. The rabbit ran up a narrow roadway, and when within a few feet of the laurel bed suddenly stopped. Instantly the cat sprang upon it, and seizing it in its mouth ran directly up the mountain side, where my companions shot him.

Cowardly Animals.

Romancing newspaper correspondents and hunters with fertile imaginations have been instrumental in creating an impression, which seems to be generally accepted by the common mass of people, who were not acquainted with the true nature of wildcats; that these animals are daring, ferocious and always on the outlook to spill human gore, and will not hesitate an instant to attack human beings, no matter how big and ugly the latter may be. This, however, is not the case. Wildcats are cowardly and will flee from their pursuers, but if wounded and unable to escape, or if surprised in a place where they cannot get away, and forced to give battle, they will fight viciously and do great execution with their strong retractile claws and sharp teeth.

Treed Her Lover.

One of our correspondents in southwestern Pennsylvania writing on this topic, says: "The catamount is a destructive and ferocious animal, for one attacked me one night when I was going home from courting a girl, and treed me on a fence, and I had to stay there till daylight." This surely is a unique case, and it possibly may be that wildcats are inclined to attack young men who are in love.

Where the Young Are Found.

The Wildcat usually makes its domicile or nest in a hollow tree or log. The nest is well lined with leaves, moss and lichens (Usnea barbata and its varieties), called commonly "hair moss." The nest is also sometimes found in rocky ledges and caves. From two to four constitute a litter. It is stated that the young are brought forth the middle of May. Wildcats may be caught in traps baited with rabbits, chickens, grouse or fresh meat. Their fur has very little commercial value.

MINK.

The Mink is found generally throughout the State and is fairly plentiful. It is expert at swimming and diving, and able to remain long under water, where it pursues and catches fish, which it fre-

MINK.

quently destroys in large numbers. Dr. C. Hart Merriam says: "Oftentimes its destructiveness in this respect renders it a serious obstacle in the industry of fish culture."

Fond of Brook Trout.

Along some of our mountain streams, where Minks are plentiful, hunters and woodsmen claim that many brook trout, generally the large sized ones are killed by these amphibious depredators.

Chickens and Duck are Favorite Food.

The Mink does much damage to poultry, especially chickens and ducks. Various kinds of wild birds, particularly ground-nesting species, crayfish, frogs and reptiles are included in the dietary of the mink; and it is also learned from the testimony of different writers and observers that the eggs of domestic fowls are often taken by these nocturnal plunderers.

Kill Pheasants, Quail and Rabbits.

Sportsmen despise and condemn Minks because of the taste these brown-coated marauders have acquired for pheasants, quail, rabbits and squirrels. Rails and other marsh inhabiting birds frequenting a locality where Minks resort, are often preyed upon by these bloodthirsty and keen-scented quadrupeds.

Injurious rodents, such as mice, rats and muskrats, so troublesome on the farm, which the mink eat, do not, we are assured by eminent naturalists who have given much attention to the economic status of Minks, compensate the loss occasioned by their attacks on barn-yard fowls, fish and game.

The aquatic nature of the Mink is such that it is usually found inhabiting the borders of streams, mill ponds or dams. When Minks take up a residence in or near the farmer's poultry house, as is frequently the case, they have been known to destroy every fowl in the place in a short time.

It is claimed by some that the Mink feeds upon insects; this may be true, but as I have only examined the stomach-contents of four of these animals captured at a period of the year when insect life was abundant, and neither of them showed, on dissection any evidence of such food, I am not, of course, prepared to confirm or deny the statement.

A Muscular Animal.

The average weight of an adult Mink is about two pounds, and for an animal so small it is astonishing to observe the great strength it possesses. Dr. Merriam cites an instance where a Mink "was known to drag a mallard duck more than a mile, to get it to its hole, where it was joined by its mate."

The Mink can be easily taken in steel traps or dead falls; it is remarkably tenacious of life and will live for many hours struggling under the pressure of a pole or log which squeezes its body almost flat. Audubon and Bachman relate a case where they found a live Mink under a dead-fall with a pole across its body held down by a weight of one hundred and fifty pounds, beneath which it had struggled for nearly a whole day. The steel trap which is commonly employed for catching Minks should be concealed with ordinary care, and baited with fish, a small bird or the head of either, a pheasant, duck or chicken.

Fish Oil Allures the Mink.

"Professional Trappers," Dr. C. Hart Merriam writes, "find the Mink attracted by the smell of an oil made from fish that have been allowed to decay in a loosely corked bottle placed in the sun."

"The odor from this oil is said to be effective at a considerable distance, and a few drops of it will often entice a Mink into a trap when no bait is visible."

The following extracts taken from letters on file in our office, and which have been kindly sent us by farmers, naturalists and sportsmen, show very clearly the character of depredations done by this animal:

MR. PIERSON, DYSART, PA.:

Have known of hundreds of geese, ducks and turkeys and also chickens to be killed by weasles, minks, skunks and foxes. A weasel killed 34 chickens in one night; a mink, 3 ducks in one night; a fox, 2 geese in one night; a skunk, 2 chickens in one night; a mink, 2 chickens in one night at different times at my place. Could cite you a hundred similar cases. This county loses over $6,000 a year from foxes, minks and weasels.

C. P. MOTT, MILFORD, PA.:

Minks too few to cut any great figure, but more than needed. They love the farmer's poultry and are loath to be satisfied with less than the whole coop.

F. H. FASSETT, MESHOPPEN, PA.:

About one year ago one of my neighbors lost three or four grown chickens by a mink; was finally caught.

THOS. SEABORNE, NEWLIN, PA.:

Minks are very destructive to poultry. When they attack poultry, they kill the whole flock before they stop; only eating perhaps, part of one or two at most.

GEO. PERMAR, GAME AND FISH WARDEN, NEW CASTLE, PA.:

Minks are very plentiful in some localities, and they are especially destructive to our hen roosts.

C. K. SOBER, LEWISBURG, UNION COUNTY:

Minks are great destroyers of poultry. Some years ago on the farm a family of minks took up their abode under a pig pen, and before we were aware of their presence they had killed not less than one-hundred and fifty chickens, large and small. Finally when the marauders were located we were obliged to tear down the pen and killed two old and five young ones, the latter about one-third grown.

JOHN L. KLINE, LIVERPOOL, PERRY COUNTY:

Minks are very destructive to game and poultry. I have known the mink to kill as high as thirty to forty ducks in one night. I have known them to enter a chicken coop and kill as high as twenty chickens.

J. M. DUMM, MACKEYVILLE, CLINTON COUNTY:

Two years ago my next neighbor had fifty young chickens killed in one night; I went to his home with my dog, but we could not catch the supposed mink. The following morning my other neighbor across the way had about sixty young chickens destroyed. The dog barked at a stone pile in the yard, and with some help we killed six three-fourth grown minks, the old one escaping.

H. K. MENSCH, MUNCY STATION, LYCOMING COUNTY:

Minks are plenty and do much damage to poultry.

R. S. STOVER, LIVONIA, CENTRE COUNTY:

Minks are bad on chickens in summer.

HON. A. L. MARTIN, ENON VALLEY, LAWRENCE COUNTY:

A mink broke in my chicken house and one night cut the throats of thirty-seven chickens eight weeks old; different nights did other injuries until captured.

HON. N. F. UNDERWOOD, LAKE COMO, WAYNE COUNTY:

Minks still common here; sometimes destructive to poultry; will kill more than they can eat or carry away. Know of one case as follows: A brother-in-law of mine found that something was killing off his chickens, after losing a number he took those that were left alive and put them on the barn floor, turning a large dry goods box over them, the next morning he found them all killed and a mink in the box. The mink had squeezed himself through a small aperture between one edge of the box and the floor, and gorged himself on chicken until he was too large to squeeze out. Fishermen here say that minks are very destructive to the trout in our streams.

JOHN F. THOMAS, CARROLLTOWN, CAMBRIA COUNTY:

The mink does much damage in poultry yards, particularly those situated near creeks or near the head of a minor tributary. In this locality they are often taken with the common steel trap when on their predatory expeditions. The mink travels, generally in the night, but they have been caught in daylight.

A. W. RHOADS, WILKES-BARRE, LUZERNE COUNTY:

I had a large flock of ducks which were destroyed by a mink and weasel which I saw along the brook frequented by the ducks.

The weasel, mink and red fox destroy fowls.

It has been, for years, a custom among a few enthusiastic sportsmen, like myself, to poison with strychnine skunks, foxes and wildcats, by the use of fresh meat or sparrows impaled on a stick and placed on old roads and paths in the snow. The weasel and mink are trapped with the ordinary spring trap.

I. D. HOWELL, ———.

Minks are common in our county near the creeks, runs, races, dams and ponds; they do not go far from their secure harbors in daylight, but get their if not disturbed will kill all the fowls in the coop, and fill themselves so full of blood, that they cannot get out at the opening where they entered, in this way they are often captured. I have taken out a bushel basket of dead chickens, the work of one mink in one night. I have often dug out their dens and found the whole family; seldom found the remains or feathers of forest birds, but saw chicken feathers, sometimes fish, frogs, snakes, etc.

C. W. PENNELL, HEMLOCK HOLLOW, WAYNE COUNTY:

A mink visited my mother's hen roost and killed nine grown chickens the first night, and the second night finished the flock; the third night they caught him in a steel trap. Think the State should pay a bounty on minks.

W. B. K. JOHNSON, ALLENTOWN, LEHIGH COUNTY:

I saw a mink take a chicken in broad daylight.

J. B. OVIATT, NORWICH, McKEAN COUNTY:

Have seen where minks have caught fish in winter time and have brought them on shore and eat or hid them; they can easily catch fish when the water is low. Minks are destructive to birds, fowls and game, such as partridges, rabbits, etc.

N. G. BUNNELL, VOSBURG, WYOMING COUNTY:

Minks are scarce, but sometimes a few follow streams from the river, and are bad on poultry.

GEORGE M. DAY, DYBERRY, WAYNE COUNTY:

We lost sixty out of eighty-five chickens the past summer by minks.

GEORGE FRANC, ARIEL, WAYNE COUNTY:

The mink destroys fish, especially trout, and also fowls.

J. S. GAY, TERRYTOWN, BRADFORD COUNTY:

I have known a mink to catch twenty-seven hens in two nights. Minks dive down into the water and catch fish.

W. M. BENNINGER, WALNUTPORT, NORTHAMPTON COUNTY:

Minks and weasels have done great damage to our poultry, they have killed hundreds of young chickens for me and my neighbors, and we find them very difficult to eradicate.

EMIL ULRICH, STROUDSBURG, MONROE COUNTY:

Can only speak about the mink which I have seen fishing in the creek. Swimming under the water, and especially in deep holes where trout like to stay, the mink will soon capture one, and most generally the largest fish. We kill or trap some every winter; the trapping on my place is a privilege accorded to the boys of one my neighbors. I killed a mink some years ago in the most peculiar way. It was on the 30th of July, when I was going towards the creek with my little girl, and saw a mink traveling along the creek on a fishing expedition. I sent my daughter to the house with a message to bring my gun down, remaining perfectly quiet. The mink, who had been on the other side of the creek (it is only three or four yards wide), took to the water and landed right in front of me; not wishing him to escape, I jumped, and landed right on his back. The ground being soft, he got from under my foot and went back into the creek, but I was bent upon having his hide, and, unmindful that it was Sunday, and I was dressed in my best, I jumped after him into the water, and luckily gave him another taste of my boot heel, which seemed to have broken his back; he crawled slowly the shore, when another kick settled him.

My wife shot a mink when he was in the act of carrying away a young brahma chicken almost as big as himself, and I have missed many eggs taken by minks; they do not destroy or suck the eggs in the nest, but take them away, but when it comes to the nest egg made of porcelain, they found out the mistake and shortly dropped it. Young ducks were always lost when big enough to go to water; one after another would disappear, and I lay this to the mink.

L. M. CASTETTER, GREEN BURR, CLINTON COUNTY:

People living at a distance from streams do not know what a pest minks are, but those who live close to the streams know all about them, for they have to shut their poultry houses very close; if they neglect it once, they can be sure they will lose the whole stock, as the mink will not stop at one or half a dozen but as long as they can find a living chicken they will kill. Not over a week ago a farmer lost forty-eight chickens in one night. They really destroy more poultry on an average that the fox. There should be a good bounty on them, not less than $1.00 for each mink.

GEORGE G. HUTCHINSON, WARRIORS' MARK, HUNTINGDON COUNTY:

Minks are numerous along the streams in this region. Have known one mink to kill thirty chickens in a night.

JOHN KELLOW, CARLEY BROOK, WAYNE COUNTY:

Minks are partial to poultry, and act similarly to the weasel, that is, bite them in the neck and suck the blood and leave the carcass; have known fifteen hens in one coop killed in one night by mink. Minks are at home under the water, where they catch fish.

W. R. PARK, ATHENS, BRADFORD COUNTY:

Minks catch fish; I shot one once with a trout in its mouth. Know of minks catching my neighbors chickens.

F. M. McKEEHAN, FERGUSON, PERRY COUNTY:

Tolerably common along our streams. Are destructive to poultry and fish, especially if they breed near your residence. I live on the Little Buffalo creek and have lost many dollars worth of poultry since here (1876.)

TOWNSEND PRICE, CANADENSIS, MONROE COUNTY:

Minks are destructive to poultry, game and fish, and they catch a great many chickens and ducks.

ENOS BLOOM, NEW MILLPORT, CLEARFIELD COUNTY:

I think the mink to be the most destructive to poultry of any and all enemies. I could, if required, enumerate by the hundreds chickens that were killed by the minks in our valley.

C. R. NOYES, WESTPORT, PA.:

The minks destroy poultry, both chickens and turkeys; but they also destroy rats and mice in large quantities; on the whole, perhaps one will balance the other.

J. K. BIRD, MILLVILLE, SULLIVAN COUNTY:

The mink is scarce; he destroys poultry and is very destructive.

D. KISTLER, KISTLER, PA.:

The minks are plenty and destroy a great deal of poultry.

T. H. HARTER, BELLEFONTE, CENTRE COUNTY:

The mink is very destructive to pheasant or common grouse.

ZIBA SCOTT, SPRING BROOK, LACKAWANNA COUNTY:

The mink is a very mischievous little scamp; he is full of tricks; he likes to kill chickens for their blood; if he gets in a chicken coop he seldom leaves one alive. One got in my mother's coop one night, killing thirty-five chickens, but we put a dog on his trail in the morning, run him into a hole and killed him. He also likes fish; brook trout suits him the best if he can get them; he is an expert swimmer, goes under the water and catches them easily. I have shot two within the past year with trout in their mouths; the last one had a trout eight inches long. He also catches rabbits and pheasants.

JOHN NELSON, TALLEY CAVEY, ALLEGHENY COUNTY:

The mink is notorious; he killed many of our ducks and chickens; if he can get in the coop at night he leaves none to tell the tale; will carry off chickens nearly half grown. Minks are very fond of eggs.

JOSIAH PILE, NEW LEXINGTON, SOMERSET COUNTY:

Sometime ago there were eighteen full grown chickens killed in my chicken house in one night, all bit about the head and neck; I found the place where the thief entered, set a trap and caught a mink. Another time there were ten killed, and still another time twelve killed all in the same way. Caught a mink every time.

Additional Notes on Food of Minks.

Name and Address of Observer.	Poultry.	Remarks.
L. C. Oberlin, Schmicksburg, Pa.,	Destroy chickens and turkeys,	Have known a mink to kill 30 or 40 in one night.
J. L. Brannen, Exchange, Pa.,	Destroy chickens,	
Noah H. Parker, Gardeau, Pa.,	Destroy chickens,	They also destroy fish and mice.
W. J. Stull, Coalport, Pa.,	Destroy chickens,	20 were killed in one night by a mink.
J. W. Van Kirk, Milton, Pa.,	Destroy ducks,	On one occasion I lost eight ducks; each was bitten in the neck.
Jasper T. Jennings, New Milford, Pa.,	Destroy poultry,	They usually disturb poultry in the neighborhood of streams they frequent.
S. S. Thomas, Lynn, Pa.,	Destroy chickens,	A mink will frequently kill all the chickens in a roost.
C. P. Mott, Milford, Pa.,	Destroy chickens,	Generally kill all in the coop.
G. C. Bell, Maplewood, Pa.,	Destroy chickens,	They also destroy many fish.
Melanthan Mench, Mifflinburg, Pa.,	Destroy chickens and ducks,	A mink destroyed three old ducks and 16 marketable chickens.
C. W. Dickinson, Norwich, Pa.,	Destroy chickens and ducks,	
Thos. B. Darlington, West Chester, Pa.,	Destroy poultry,	Minks and weasles are both poultry loving pests.

WEASEL.

The reasons whereby this little animal gets its name are worthy of note and so we begin our paper with an explanation of them.

The technical name Putorius is taken from "putor" a "bad smell." 'Tis a most appropriate title for both sexes have the powers of emitting a "peculiar fluid" which is most offensive and only a little less pungent and piercing than that of the skunk. Skinner tells us that "stoat" comes from the Belgic "stout" "bold" and in England he is called Stout to the present time. Certainly he deserves this name, for game larger than himself. deters him not, long runs through bush and briar—he seldom takes to the open—carry no fear to his little heart, as he bounds along in great leaps or runs with remarkable celerity in search of prey. Not to the land alone does he confine himself in this search, however, but in under ground passages made by the rabbit or mouse and also in the water, his long slender body aiding his advance. The unwary bird who has paused on some low bush to carol forth his song or wet his parched throat at the running brook or rests quietly on the bough in the hush of the night, have frequently met their death by the teeth of this little creature. Mr. Wm. Macgillivray says of him "in proportion to his size he is at least as courageous as a lion." So much for the cognomen Stout and now let us turn our attention to that of "Ermine." Dr. Elliott Coues in his admirably written work on "Fur Bearing Animals" says of this one "Gwillim" in his "Display of Heraldrie" gives the following etymology of Ermine. "This is a little beast lesse than a squirrel, that hath his being in the woods of the land of Armenia whereof he taketh his name." The latter word is sometimes written in English "ermin" or "ermelin" and the same term occurs in several other languages."

The same writer (Coues) also says: A glance at the physiognomy of the Weasels would suffice to betray their character; the teeth are almost of the highest known raptorial character; the jaws are worked by enormous masses of muscles covering all the side of the skull; the forehead is low and the nose is sharp; the eyes are small, penetrating, cunning and glitter with an angry green light. There is something peculiar, moreover, in the way that this fierce face surmounts a body extraordinary wiry, lithe and muscular. It ends a remarkably long and slender neck in such a way that it may be held at right angle with the axis of the latter. When the animal is glancing around with the neck stretched up and the flat triangular head bent forward and swaying from one side to the other we catch the likeness in a moment—it is the image of a serpent." So we have this sanguinary animal compared, by two eminent authorities in this line, as like a lion for courage and a serpent in manner and appearance.

CHANGES HIS COAT.

His coat changes with the seasons and while in winter we find it white tinted with sulphur yellow—in summer it is on upper parts of a dark brown not unlike the coloring of a mink; on its under parts it is "white almost invariably tinged with sulphury yellow" (Coues). The tail partakes of the color of the upper parts, except the bushy end which in summer and winter, alike, is black. Its legs are short with slender feet and are covered all over with fur in winter, but in summer the pads are generally visible.

Their homes are frequently to be found in a decayed tree stump and under rocks.

HUNTS HIS PREY BY SCENT.

Concerning his power of hunting his prey by scent, eminent authorities are positive that he does track quarry in this manner.

Mr. Hogg in London Magazine describes how in December, 1831, he observed a Stout hunting in this style. "I was an eye witness to the fact of a Stout being able to pursue its prey on scent."

Coues writes of it as follows: "Swift and sure footed he makes open chase and runs down his prey-keen of scent he tracks them."

DESTROYS POULTRY.

The poultry yard is frequently visited and his apparently insatiable desire for rapine is most clearly shown while on these visits. One chicken will satisfy his appetite, but after that is gratified he does not leave; he kills and slays without mercy all the remainder of the poor frightened chickens, until there are none left and not until then does he leave the scene of carnage.

He sucks the eggs also, leaving in some instances the unlucky farmer who was unwillingly and unwittingly been his host completely routed as regards his efforts in the poultry line.

The Ermine is much more abundant than its smaller relative the least weasel which from evidence at hand seems to be most frequently met with in the northern and mountainous regions of our State. The Ermine, however, is common and is present in all sections of the Commonwealth.

FOOD MATERIAL OF WEASELS.

From the testimony of various writers and other well-informed and competent observers, it would appear as if the weasels, although undoubtedly great destroyers of mice and also of rats, are extremely detrimental to poultry, especially chickens, as well as game, particularly ruffed grouse and rabbits, together with many kinds of small wild birds.

Robert Kennicott, in his report of the quadrupeds of Illinois, as quoted by Dr. C. Hart Merriam in the Mammalia of the Adirondack region of Northeastern New York, says in writing of the Ermine, or Common Weasel: "A more fierce and cruel mammal does not exist in America than this Weasel. The courage and sanguinary disposition of the panther are insignificant in comparison, having regard to the strength of the two. Without hesitation, the Weasel attacks animals five or ten times its own size, and not content with killing enough for food, wantonly destroys whatever life it can. When a Weasel has gained access to a poultry yard it will frequently kill every fowl within its reach in a single night. Fortunately, however, this animal, even when abundant, does not enter the farm yard so frequently as might be expected, appearing to prefer a free life in the woods to easy but more dangerous feasts on domestic fowls. Meadow mice are certainly the greatest pests among mammals in Northern Illinois, and of these the Weasel destroys great numbers.

Feeds on Rats and Mice.

"Stacks and barnfuls of grain are often overrun with rats and mice; but let a Weasel take up his residence there and soon the pests will disappear. A Weasel will, occasionally, remain for some time in a barn feeding on these vermin without disturbing the fowls. But it is never safe to trust one near the poultry yard, for, when once an attack is made, there is no limit to the destruction. When the animal has entered stacks or barns, it has a curious habit of collecting in a particular place the bodies of the rats and mice it has slain, thus, sometimes a pile of a hundred or more of their victims may be seen which have been killed in the course of two or three nights."

The activity and strength of the Weasel are such that he is able to climb trees with great ease, either to escape enemies or to search for food.

This ability as a tree climber enables him to destroy both the eggs and young of different species of birds which erect their homes in the forest, shade and fruit trees.

The nests of the ruffed grouse, wild turkeys and bob-white, or quail, besides those of other species of the feathered kinds which nest on or near the ground, are often, it is asserted, pillaged by the inquisitive and bright-eyed Weasels.

Although Weasels hunt both by day and night, the popular idea seems to be that they are more nocturnal than diurnal. While it is doubtless true that they subsist, to some extent, on various kinds of insects, particularly beetles and occasionally grasshoppers, the amount of insect life which they consume is not, so far as the observations of the writer have gone, very considerable.

A Rabbit Hunter.

Weasels, like the fox hound or trained and well bred pointer or setter, follow the tracks of their prey by the scent. In this way large animals such as gray rabbits and even the varying hare which latter animal occurs and is tolerably plentiful in many of the higher mountainous districts of our State, are pursued and overpowered in their securest retreats.

In regard to its power of hunting by scent, Thomas Bell, says: "In pursuing a rat or mouse, it not only follows it as long as it remains in sight but continues the chase after it has disappeared, with its head raised a little above the ground, following the exact tract recently taken by its destined prey. Should it lose the scent, it returns to the point where it was lost, and quarters the ground with great diligence until it has recovered it; and thus, by dint of perseverance, will ultimately hunt down a swifter and even stronger animal than itself. But this is not all. In the pertinacity of its pursuit, it will readily take the water and swim with great ease after its prey."

I have heard hunters and woodsmen say that "White" Weasels can easily detect the ruffed grouse, which frequently in winter has the habit of plunging into the loose snow, and that they destroy many of these birds in such hiding places.

Audubon, the famous naturalist, records an instance that came under his personal observation, of where an ermine captured a rabbit and after beheading it, the fierce little depredator dragged the body some twenty yards over the fresh fallen snow, beneath which it was concealed and the snow slightly pressed down over it.

OBSERVATIONS OF FARMERS AND NATURALISTS.

The following extracts concerning the habits of weasels are taken from letters received by the writer from farmers, poultry-raisers, sportsmen and naturalists.

JOHN F. THOMAS, CARROLLTOWN, CAMBRIA COUNTY:

I have known the weasel to kill six full grown hens in one night on my father's farm. It is supposed that it kills its victims for their blood only, and all the fowls killed by it, that I have seen, substantiate this, since in every case the blood-vessels of the neck were severed close to the head and there was apparently no flesh missing. I recollect an experience, when a boy that proves them to be remarkably bold at times. I was pursuing one that had in its mouth a mouse; in an attempt to strike it with a stone, I struck the mouse with such force as to throw it a distance of eight or nine feet from the fence, when to my surprise, he immediately left the fence and regained the mouse and disappeared along the fence. They seem to have a greater appetite for mice and rats than poultry, as I have known them to be in my father's barn for several weeks and yet we never missed any poultry, but there was a noticable decrease of rats.

A. W. RHOADS, WILKES-BARRE, PA.:

The weasel, I am sure after years of personal experience and observation and careful study, is the worst enemy the pheasant and quail have. I have repeatedly tracked a weasel that had followed the track of a quail and pheasant in the snow, and at last came upon the dead birds. I, on one occasion, saw a nest of thirteen pheasant eggs, about to be hatched and in returning in an hour found that eleven of them had been destroyed by a weasel which I saw and killed.

C. P. MOTT, MILFORD, PA.:

Weasels are the greatest destroyers of game and poultry, and they deserve total extinction. I know of no redeeming feature or any possible usefulness alive in their wild state. They are scarce when small game is, and numerous when such game is easy prey. They seem to be travelers and to such parts as are prolific of game. There is no escape for the rabbit when once they get its track, and a nest of grouse eggs furnishes him a meal, if the hen bird escapes his quick stealthy approach. I consider that the weasel has no equal as an enemy of game.

ARTHUR MARTIN, SANDY LAKE, PA.:

We have the weasel; they destroy poultry to a great extent; sometimes will, or have for us, killed whole broods, but at the same time are great hunters for mice, rabbits and small game.

HON. N. F. UNDERWOOD, LAKE COMO, WAYNE COUNTY:

Some weasels; don't do much damage; they will occasionally destroy chickens.

D. KISTLER, KISTLER, PA.:

The weasel abounds and will kill grown chickens.

ENOS BLOOM, NEW MILLPORT, CLEARFIELD COUNTY:

The weasels are plentiful and also destructive to poultry.

JOHN F. WEAKLY, SLIPPERY ROCK, PA.:

Weasels will kill a whole flock of turkeys or chickens at a time; have known them to kill as high as twenty at a time.

C. R. NOYES, WESTPORT, PA.:

Weasels kill chickens, but I think not when they can get rats or mice.

The following table contains the condensed reports of one hundred observers, residing in Pennsylvania, and of these gentlemen, probably not less than eighty-five are practical farmers and poultry-raisers.

The X indicates the animals specified in the column-heading under which it occurs which the Weasels have been observed to usually prey upon by the gentlemen opposite to whose names said mark (X) is placed.

FOOD OF WEASELS.

Observers.	Poultry.	Chickens.	Turkeys.	Ducks.	Geese.	Small wild birds.	Game.	Pheasants.	Rabbits.	Squirrels.	Rats.	Mice.	Remarks.
Alexander, B., Cambria co.,	X												They are quite common.
Appleby, George S., Huntingdon co.,	X												Abundant and very troublesome to farmers.
Albaugh, J., Forest co.,	X					X							They destroy many small birds.
Ammerman, J. M., Columbia co.,	X												They are also great enemies to game.
Behr, Otto., Sullivan co.,												X	They subsist to a large extent on mice.
Benjamin, F. L., Lackawanna co.,		X											At times do a great deal of mischief.
Bothell, Samuel, Indiana co.,	X												Common.
Buckalew, Capt. J. M., Columbia co.,	X												Not sufficiently numerous to do serious damage.
Browning, H. M., Bradford co.,	X												At times they do serious damage in the poultry yard.
Brannen, J. L., Montour co.,	X						X						They are quite destructive.
Brown, Hon. G. C., York co.,	X												Unless well guarded it would be a precarious business to raise chickens, ducks or turkeys.
Bigler, Dr. Wm. B., York co.,		X		X									The weasel kills quite a number at one sitting, not eating the flesh, but taking the blood.
Benninger, W. M., Lehigh co.,	X												They have done great damage to our poultry.
Bisbing, Randall, Monroe co.,	X								X				Yet they prefer rats to chickens and won't kill the latter as long as rats are plentiful.
Cope, David, Chester co.,	X												Occasionally do considerable damage.
Criste, Hon. P. J., Northumberland co.,	X						X						They are fond of poultry and game.
Cannon, John, Luzerne co.,		X		X									They killed all my ducks and chickens.
Critchfield, Hon. N. B., Somerset co.,	X						X						Destroy some poultry and game.
Dickinson, C. W., McKean co.,		X		X									Depredations to poultry do not often occur.
Davis, E. M., Clearfield co.,		X											Have known a weasel to kill 80 chickens in one night.
Drasher, Wesley, Luzerne co.,		X											Killed 14 chickens in one night.
Dobert, Peter, Luzerne county,		X											Killed 44 chickens in two nights.
Darlington, Thos. B., Chester co.,	X												
Fernald, Prof. H. T., Centre co.,		X											Eighteen chickens were found on one occasion with blood sucked out; attributed to weasels.
Friant, George P., Lackawanna co.,	X					X	X						Farmers and sportsmen make many complaints about damage done by large weasels.
Frankenfield, H. T., Monroe co.,	X												Will destroy a whole brood in one night.
Filbert, Benjamin A., Schuylkill co.,		X											We have frequently lost chickens
Goldsborough, Dr. E. C., Adams co.,		X											They are almost as bad as foxes.
Gay, J S., Bradford co.,	X												They are common and destructive.
Gager, E. B., Wayne co.,	X												
Hilliard, Jacob, Armstrong co.,		X											One killed 9 full-grown chickens in one night.

FOOD OF WEASELS—*Continued.*

Observers.	Poultry.	Chickens.	Turkeys.	Ducks.	Geese.	Small wild birds.	Game.	Pheasants.	Rabbits.	Squirrels.	Rats.	Mice.	Remarks.
Herbison, James, Armstrong co.,		X											Tolerably common.
Hazzard, Dr. T. L., Allegheny co.,	X												Occasionally take fowls, mostly young ones.
Herbertson, W. H., Fayette co.,	X						X						Common and very destructive.
Hostetter, Ed. B., Somerset co.,	X												Common and very destructive.
Homer, F. L., Mercer co.,		X											Have caught them in the act of killing chickens.
Haslet, S. H., Forest co.,		X							X		X		They are quite plentiful.
Jones, Amon, Wayne co.,		X											They are very destructive.
Jennings, Jasper T., Susquehanna co.,		X									X	X	Occasionally destroy chickens, but do much good by destroying rats and mice.
Karstetter, C. M., Clinton co.,	X						X						Common and very destructive.
Kyle, J. W., Mifflin co.,	X						X						Weasels are rather rare in this region.
King, Harrison, Somerset co.,		X											Weasels killed 30 chickens in one night.
Kline, John L., Snyder co.,			X					X	X	X			Gray squirrels.
Kemerer, M. E., Carbon co.,		X					X						They also kill other kinds of poultry and much game.
Luhr, Hon. Charles, Elk co.,	X						X						But damage done is not serious.
Linn, Hugh, Allegheny co.,	X						X				X		Tolerably common.
Lyman, M. B., Susquehanna co.,	X												Occasionally kill poultry.
Mench, Melanthon, Union co.,												X	They are good ratters.
Mensch, N. K., Union co.,	X												Abundant; do considerable damage to poultry and game.
McSparran, Jas. G., Lancaster co.,	X												Tolerably common.
McKeehan, F. M., Perry co.,		X											Common and very destructive to young chicks.
Monroe, Alexander, Bradford co.,	X											X	Take a few mice; one killed 9 fowls in one night.
Murphy, Hon. S. D., Westmoreland co.,	X												They are quite numerous and destructive.
Murrin, Charles, Luzerne co.,		X											Killed 8 in one night.
McCrea, Dr. A. B., Columbia co.,	X												Frequently destroy poultry, especially breeding hens.
Meixel, J. B., Cumberland co.,	X						X						Common and very destructive.
Mullin, T. G., Clearfield co.,	X						X						They are common and do much mischief.
Martin, Hon. A. L., Lawrence co.,		X											Had 8 destroyed recently by a weasel.
Moore, Dr. H. D., Somerset co.,	X												Common.
Montgomery, George, Washington co.,		X	X										Killed 21 young chickens and turkeys in one night.
Nease, James S., Washington co.,		X											Tolerably common and very bold.
Nelson, Seth, Jr., Clinton co.,		X					X	X	X				Quite numerous and very destructive.
Oberlin, T. C., Indiana co.,	X												Common and very destructive.
Ovlatt, J. B., McKean co.,	X					X							They are common.
Price, Townsend, Monroe co.,							X						Destroy especially rabbits and pheasants.

Phelps, J. B., Crawford co., ...									X			X	Common, and beneficial to farmer.
Park, W. K., Bradford co., ...	X						X						Tolerably common and very destructive.
Permar, George M., Lawrence co., ...	X						X						Locally abundant and destructive to chickens.
Pennell, C. W., Wayne co., ...	X												A weasel killed and crippled 7 of my hens in one night.
Phillippi, J., Somerset co., ...	X						X						They do considerable damage.
Perry, John, McKean co., ...	X						X						They are common and bad.
Rooke, Dr. Levi, Union co., ...	X						X						
Rangler, Frank, Union co., ...		X	X	X									They are very destructive, especially to young poultry.
Schall, J. S., Northampton co..	X												They are very destructive.
Smith, Tunis, Wayne co., ...	X										X	X	They feed chiefly on mice and rats, but sometimes kill poultry.
Stover, R. S., Centre co., ...	X					X	X						Common, and very destructive.
Scott, Ziba, Lackawanna co., ...		X					X	X	X				Common and very destructive.
Sisson, A. C., Lackawanna co., ...	X										X	X	Weasels now and then catch a chicken, but their principal food is rodents.
Sober, C. K., Union co., ...	X						X	X	X		X	X	Common and destructive.
Sober, M. L., Northumberland co., ...		X						X	X			X	Quite numerous and bloodthirsty.
Smith, A. Judson, Clearfield co., ...	X												1 one had a flock of about 200 young chickens, and in one morning a weasel killed about 12 or 15, and he would have killed all, I believe, but I killed the weasel.
Stunkard, J., Jefferson co., ...	X												They annually destroy many chickens for us.
Stocker, John E., Luzerne co., ...	X								X	X			They are numerous in mountainous districts.
Sargeant, W. G., Crawford co., ...	X												Not sufficiently numerous here to do serious damage.
Schnatterly, Dr. L. W., Armstrong co..	X						X						They are exceedingly destructive.
Tucker, L. A., Crawford co., ...	X												Weasels are particularly destructive to poultry.
Trescott, M. B., Luzerne co., ...	X						X						Common and quite destructive.
Thomas, James, Clearfield co., ...		X											They are plentiful; killed 21 chickens in one night.
Taggart, Hon. A. L., Montgomery co....	X						X					X	Common and very troublesome.
Van Etten, J. H., Pike co., ...		X	X	X	X								Weasels killed 13 chickens at one time.
Van Fleet, Dr. W., Chester co., ...		X					X						Have known many cases of their depredations.
Willson, S., Bradford co., ...		X									X	X	They kill young chickens and many mice and rats.
Wilson, Harry, Chester co., ...	X												They are very destructive to poultry.
Wood, George W., Wayne co., ...	X												Are quite numerous and very destructive.
Wehrle, R. W., Indiana co., ...	X												They do considerable damage to poultry.
Waggenseller, Dr. F. J., Snyder co., ...	X								X				Have known a weasel to kill 6 pigeons in one night and 3 the next night. Knew a weasel to kill 30 or 40 young chickens in one week.
Wright, A. W., Huntingdon co., ...		X	X										Common and very destructive.
Wagner, W. F., Clearfield co., ...	X												Common and very destructive.
Warnick, Isaiah, Chester co., ...	X						X						They are very destructive to poultry.
Warren, Dr. J. L., Chester co..	X					X						X	They at times are very destructive to chickens; have known two instances where they killed small birds. They also feed on mice, and sometimes it is said eat insects.

FOXES.

Both the Red and Gray Fox are found in this State. The Red, however, is much more abundant than the Gray. In some sections of the Commonwealth foxes are quite numerous, particularly in certain of the mountainous districts. From reports received they do a great deal of damage to game and poultry. Foxes unquestionably devour large numbers of mice, grasshoppers and other insects; yet judging from the general tone of the letters received at this Department, the loss occasioned by these cunning animals is greatly in excess of the good they do.

The testimony of correspondents on the following pages shows that these wary creatures vary their diet, as time and place may require, without any apparent inconvenience to themselves. They prey on young lambs and pigs, poultry of all kinds, especially turkeys, which wander to a considerable distance from the farm buildings. Foxes have been known to attack and kill young fawns. They unquestionably devour great numbers of ruffed grouse, and kill many wild turkeys; quail and other ground nesting birds are to be numbered in their long list of victims.

While it is true they capture many of the smaller quadrupeds, the common gray rabbit and the varying hare are favorite morsels for them.

What Farmers and Others Say of Foxes.

J. E. HALLOBAUGH, PATTERSON, PA.:

We have both the red and gray fox; consider them detrimental to farmers.

SAMUEL M. DOWNS, MAUCH CHUNK, CARBON COUNTY:

Have both red and gray foxes. Gray is the most common and destructive to game and poultry. I consider both kinds detrimental to the farmer.

I. D. HOWELL.

Foxes, red and gray, are quite plentiful and increasing; since the premium for killing is stopped there is no inducement to hunters to capture them. The fox is ever prowling round improving every chance, and is very bold and daring. Several of my neighbors, last year, lost their hatching turkeys and the whole brood by a fox; a few days ago a neighboring farmer had one killed in sight of his house by a fox. The fox occasionally carries off a lamb; would steal all of them but for the old dam that is usually on guard. Last spring a year ago, there were some fifty foxes caught in this section by three hunters. The red fox is the worst.

M. C. OSBORN, HENDERSON, MERCER COUNTY:

We have some red foxes, but they are no good to the farmer; I think they hunt mice and young rabbits, but the farmer can get along without them.

THOS. B. DARLINGTON, WEST CHESTER, CHESTER COUNTY:

Foxes are more plenty than welcome, and farmers who are not hunters would be glad if there was not a fox in the county; they take a great deal of poultry and birds as anyone may see by going to a den when they have a litter of young to feed; it has been my opinion for a long time that they destroy a lot of partridges while roosting on the ground at night; they also catch the red-wing blackbird and other species which nest on or near the ground.

DR. A. B. MacCREA, BERWICK, COLUMBIA COUNTY:

Both kinds here; red common; they are destructive to poultry in the back districts. They are very detrimental to game.

ALFRED SHARPLESS, WEST CHESTER, CHESTER COUNTY:

Foxes are rather plenty and no doubt carry away many chickens, ducks and geese than cannot be accounted for from the farmer's flocks. His presence here is a nuisance because of his bringing out sportsmen and dogs who daily traverse the country throwing down and destroying fences in their reckless pursuit of him. A bounty should be placed on his scalp.

JAS. S. NEASE, WASHINGTON, WASHINGTON COUNTY:

The red fox only is found here. Destroys some rabbits, and occasionally ruffed grouse and quail. Foxes destroy bumble bees, yellow jackets and mice. I consider them to be beneficial to the farmer.

GEO. MONTGOMERY, WASHINGTON, WASHINGTON COUNTY:

A farmer who lives in the western extremity of this county told me he had nineteen turkeys killed by foxes last fall. Do not know of any gray foxes in this county. The red fox is very destructive to game and poultry, and has been known to steal a whole litter of young pigs. They kill a great many field mice, but I think they might be classed as detrimental to the farmer.

JOSIAH PILE, NEW LEXINGTON, SOMERSET COUNTY:

We have both red and gray foxes; the red is the most common and destructive. I consider both species detrimental to the farmer.

E. B. HOSTETLER, KINGSWOOD, SOMERSET COUNTY:

We have foxes, both red and gray. They will kill lambs, chickens, turkeys, pheasants, rabbits, etc.

W. J. STULL, COALPORT, CLEARFIELD COUNTY:

We have both red and gray foxes; the gray are very rare, the red more common and destructive to poultry and game. I consider foxes detrimental to the farmer.

JOHN KELLOW, CARLEY BROOK, WAYNE COUNTY:

The times are so numerous where I have personally suffered from the depredations of the red fox that I cannot detail them; every year we lose from five to twenty turkeys by them. Three years ago I lost eleven out of a flock of twenty turkeys, and in the daytime, while the workmen in a neighboring hay field were looking on. The turkeys were catching grasshoppers in a pasture lot adjoining the hayfield, but at some distance from the men; there was some woods close to the pasture, and when the foxes attacked them they flew in every direction. It was near evening; as soon as the workmen told us we went for them and recovered four or five before dark; the next morning we found four or five in the trees, in all we got nine out of twenty. Sometimes the foxes will find a hen turkey sitting on a nest of eggs, when they take both turkey and eggs. I could tell of scores of their depredations. It would take a ream of paper to detail all of the mischief of the red devils.

JEREMIAH PHILLIPS, GARRETT, SOMERSET COUNTY:

Three years ago, right in our neighborhood, there were about 100 young foxes caught for premiums, and if they had made their escape the farmers could not have raised any lambs or poultry. One spring there was a den of foxes close by my fathers, and he caught about 60 turkeys and probably twice as many chickens in the neighborhood. One Sunday we heard a racket among our hens. My father walked out to see what was wrong, and there was a fox going for them. He went back to the house, got his rifle and shot him; he had killed eight chickens. I could name several cases like this. I have on several occasions found dens which were well filled with the remains of poultry, pheasants, small song birds and lambs.

SAMUEL BOTHELL, SHELOCTA, INDIANA COUNTY:

Both species occur here; about eight red to one gray. They both are very detrimental; they thin out rabbits as nothing but a very hard winter will do.

Have personal knowledge of foxes carrying off young lambs. A few years ago I lost eight; they take them any age under three weeks. Crows will kill very young lambs by picking their eyes out.

I have personal knowledge of most all domesticated fowls being killed, carried off, and injured by foxes, minks and hawks. Last summer a fox reared its young within half a mile of our poultry yard, and they carried off for us from 12 to 30 full grown chickens during the daytime. We saw them several times. A few years ago we lost 17 half-grown chickens in one night, presumably by a mink—anyway by a blood sucking animal. I have often noticed crows destroying young birds, their eggs and the eggs of fowls.

A. C. SISSON, LA PLUME, LACKAWANNA COUNTY:

Foxes, both red and gray are found here; red the most common and destructive to poultry and game, they are no benefit to the farmer, but detrimental. Foxes occasionally take young lambs.

JAMES THOMAS, CURWENSVILLE, CLEARFIELD COUNTY:

Foxes, both red and gray are very destructive and very plentiful, destroying poultry and game; also carry away young lambs, and are highly detrimental to the farmer.

HARRY WILSON, GUM TREE, CHESTER COUNTY:

I have never seen any but the red fox in Chester county. I have seen this fox catch grown hens in daytime. I once saw a fox catch a hen which owing to her weight he was unable to carry, the fox after dragging it a short distance took the hen by the head, threw it across his body over the shoulders and ran with its head to one side. It is generally believed that foxes live in holes, but I have more than once come upon them in daytime sleeping curled up dog fashion in fence corners; so I believe except as a refuge, and during breeding season, and while the litter is yet young, foxes do not live in holes. I do not believe that foxes are more detrimental to farmers than beneficial. They destroy a vast amount of field mice. I have never had a fox visit my hen roost or poultry yard except when they had a litter. I have on two occasions seen a fox chase sheep, but in both cases as the sheep ran to buildings, the fox gave up the chase. I once dug out a litter of young foxes for the fox bounty; there were five in the hole. I found along the passage way leading to main burrow two pockets or recesses, in the side of the hole; both like the nest were lined with dried grass, and contained chicken feathers, bird feathers, rabbit fur, bones, and a much decomposed weasel.

DR. L. W. SCHNATTERLY, FREEPORT, ARMSTRONG COUNTY:

Both species occur here; the red most common and destructive to poultry. They destroy a great many broods of young quail and pheasants. Both kinds destroy young lambs. Farmers tell me that they lose many lambs every spring by foxes, but it is done at night. The only true evidence they have is the finding of their pelts and bones around their dens among the rocks. Quite a number of pelts and bones have been found at one den only two miles from here.

GEORGE W. CHAMBERS, MIFFLINBURG, UNION COUNTY.

We have the red and gray foxes; the red the most common; the gray stay more on the mountains, but the red comes into the valleys and make homes among the rocks, where they are safe. They do considerable damage, and are the most destructive to poultry and game on account of their roving disposition. A few years ago an old fox made her home in a piece of timber not far from my home. Turkeys that were hatching out in the field were killed. We tried to find her but could not until a little snow fell, when one evening we found a hollow tree in which we supposed she had some young hid, being late, we concluded we would wait until morning, and that night the snow melted. In the morning we cut down the tree, but she had taken them away in the night. The tree was filled up with turkey and chicken bones. They destroy many quail and pheasants. I do not think that the fox scalp act should be repealed, for they would become so plentiful as to become a great nuisance to farmers.

F. J. WAGENSELLER, M. D., SELINSGROVE, SNYDER COUNTY:

We have both the red and gray fox; the red are the most common and the most destructive to game and poultry. I consider them detrimental to the farmer, and one of the chief causes of the decrease of game.

W. R. PARK, ATHENS, BRADFORD COUNTY:

Both red and gray foxes are present, but red most plentiful and destructive to game. Would consider them detrimental to farmers in many ways.

F. M. McKEEHAN, FERGUSON, PERRY COUNTY:

Foxes are common, but few gray ones; ordinarily foxes do not do much harm to poultry, but destroy much wild game; when they have their den of young the old she one becomes very bold. A gentleman told me last spring a fox made a raid on his poultry nearly every morning. He was on the lookout for it, when he saw it coming he ran for his rifle. When the lady of the house cried out "the fox!" The fox then turned and ran for an old hen, never stopping, but as he grabbed the hen, he shot; the fox ran on; the hen rose and flew to the barn dropping dead; the fox had bitten her in the head.

Mr. Isaac Orwan, who has given considerable thought and attention to our mammals, says, when in Northumberland county he found a den of foxes:

around which were pelts and bones of lambs. A Mr. Park residing near there had lost about 15 lambs. Another time he found a den where a weasel had just been caught and brought in. He has frequently found dens where there were plenty of poultry feathers.

JASPER T. JENNINGS, NEW MILFORD, SUSQUEHANNA COUNTY:

The fox often destroys partridges and other kinds of game, and is probably more of an enemy to the hunter and sportsman than he is to the farmer.

AARON WEIDNER, ARENDTSVILLE, ADAMS COUNTY:

We have both red and gray foxes; the gray are the most common and destructive to game and poultry. I consider both detrimental to the farmer.

C. P. MOTT, MILFORD, PIKE COUNTY:

Foxes are quite numerous, but their natural food of squirrels, rabbits, birds, mice, moles, etc., so nearly furnish their wants, that their slaughter of poultry near clearings and habitations are infrequent. They, like the weasel, mink, wildcat and groundhog, appear to have no usefulness to compensate for their depredations and should go.

JOHN F. THOMAS, CARROLLTOWN, CAMBRIA COUNTY:

Foxes are known to be destructive to all smaller game, particularly rabbits and ruffed grouse (when hatching) as well as to the quail. We have in this county both red and gray foxes, but the red predominates and is the most destructive. I think the fox (either kind) highly detrimental as regards the preservation of our game.

H. C. KNOUSE, SWALES, JUNIATA COUNTY:

Gray foxes are rare; red fox is a great enemy of both poultry and game; they depredate in day time and make bold to come close to the house; but the greatest damage they do is among turkeys, since turkeys take a wide range, and are therefore more exposed.

C. W. DICKINSON, NORWICH, McKEAN COUNTY:

Have both red and gray foxes in this county, but the red is the most common. They do but little damage to poultry; they catch a good many rabbits and partridges and many kinds of small birds. I think the fox does as much good as he does damage, for I know he catches a good many squirrels, woodchucks and field or meadow mice. The fox is a great hunter. I have seen an old she fox with five mice in her mouth at one time that she was carrying to her young. I have seen a fox with four chipmunks (ground squirrels) in her mouth at once, therefore I certainly think the fox does more good than damage to the farmer.

I have known of foxes killing turkeys, geese and chickens; a fox killed five setting turkeys for me in a single season and devoured all the eggs. The turkeys were setting on 101 eggs in the five nests. I saw the fox tracks in the soft ground around four of the nests and found where the fox had carried some of the turkeys to its den for its young.

GEO. M. DAY, DYBERRY, WAYNE COUNTY:

Mr. H. W. Adams, two years ago lost nearly 100 chickens, mostly by foxes.

Red fox is most common here. I have paid bounty on 72 foxes this fall and winter; 69 red and 3 gray fox, so give the red fox credit for most good or evil, as the case may be. If the farmer has too many chickens scattered around his fields, Mr. Fox is ready and anxious to help him care for them, or if grasshoppers and mice abound he is ever ready to reduce the crop. I watched a pair of young foxes one frosty October morning playing, hop, skip, etc., but a nearer view showed they were busy catching grasshoppers, and they kept it up an hour or more; at other times they are very busy looking for mice, and do more good that way than we usually give them credit for. An old time way to get them is to go out early in the morning (say in November) and call them up by imitating the squeak of a mouse.

H. T. FRANKENFIELD, FRUCHEYS, MONROE COUNTY:

Red and gray foxes we have here and plenty of them. I consider them detrimental to the farmer and sportsman. I have found whole coveys of quail destroyed in a single night; they eat what they can and bury the rest, the same as a dog does. I found not long ago where a tree had blown down; the tree lay high on the stump, the top on the ground; snow falling on the trunk formed a hole or cavity under the tree; the quail went under for shelter or roost; the fox sprang in the hole, and I think destroyed them all. By going to their dens where they have their young you can find feathers of poultry and game.

SAMUEL D. IRWIN, TIONESTA, FOREST COUNTY:

Reynard is well represented in the western part of Forest county, on the hills and among the rocks in the neighborhood of farms; both red and gray; the red being the most plentiful, constituting, I should judge, 75 per cent. I do not consider the fox beneficial to the farmer, especially if he wishes to engage in poultry raising. Mr. Hinton, of Tionesta township, in one week lost forty chickens out of two hundred, through the agency of foxes. They got so bold that they carried off chickens in daylight. They are extensively trapped and hunted for their pelts and scalps, on which there is a bounty in this section.

WM. D. ROMBACH, SALTSBURG, PA.:

Both red and gray foxes; think red are most numerous, and they are the most destructive. Both detrimental.

E. GARD EDWARDS, RAMEY, CLEARFIELD COUNTY:

Foxes are common and they are more destructive to game than poultry.

D. KISTLER, KISTLER, PERRY COUNTY:

The fox destroys wild turkeys, grouse and any other bird he can get. Foxes carry off lambs, and all of them ought to die. Foxes are plentiful in this locality, and they destroy a great deal of poultry.

J. K. BIRD, MILLVIEW, SULLIVAN COUNTY:

We have the red fox. They destroy poultry of all kinds, also pheasants and young lambs.

M. B. TRESCOTT, HARVEYSVILLE, LUZERNE COUNTY:

I have seen foxes catch turkeys by daylight, out in the open fields, and chickens the same way, and carry them to their burrows. I have followed and caught the whole nest of foxes, both old and young. Several years ago my father found something had killed our chickens, 22 in number, were all gone but one. He followed the trail and found the whole 21 dragged off to hiding places. The last one, still warm, was dragged into a hollow black ash. We pulled the chicken out and found a mink (a very large one) had gone in first and was still trying to drag the "old rooster" in after him, but the hole was too small. I came home one night and found an owl of very large size had lit down in the back yard and was feeding on a goose. I had a whole flock of pigeons destroyed in one night by owls. Their roost and boxes were in a long shed; we found one owl glutted so he could not fly; the others had flown to a piece of woods about 20 rods off, and after a little search we found three of the owls there unable to fly. I had a brood of half grown guineas destroyed the same way. I have seen crows dart down into a chicken yard, pick up a young chicken and fly off, and have seen hawks do the same, and sometimes take a full grown hen. I might write much more in the same line of my own experience with minks, foxes, weasels, crows, hawks and owls.

JOHN E. STOCKER, ASHLEY, LUZERNE COUNTY:

We have both red and gray foxes; the red is the most common on our mountains; they are of no value to farmers, as they destroy poultry if not secured in sheds; they are very destructive to pheasants and rabbits—to the young pheasants especially; oftentimes along the rocks one will find their dropping composed mostly of rabbit hair and toenails. English sparrows were fastened to bushes with their entrails taken out and stuffed with poison; some foxes were taken in that manner, also some dogs. Oftentimes some railroaders coming down the mountains would see foxes feeding on some recently killed cow, or be running along the track in quest of woodchucks or the cottontail, feeding on corn or grain dropped from grain cars.

GEO. FRANC, ARIEL, WAYNE COUNTY:

Foxes are quite abundant and very destructive to domestic fowls and small wild birds.

PETER COVEY, NEWFOUNDLAND, PA.: Wayne

Foxes are numerous; we have both red and gray, and they are about equal in their destructiveness to game and poultry; they are quite troublesome to farmers here. I have personal knowledge of the loss of 32 half-grown turkeys in one night. Am confident that foxes did it by the feathers scattered in all directions. Have frequently seen foxes carry off poultry.

ENOS BLOOM, NEW MILLPORT, CLEARFIELD COUNTY:

Have both red and gray foxes; the red is the most plentiful and is detrimental to the farmers; they kill and destroy poultry and kill young lambs, and are also very destructive to wild birds, such as pheasants and various other species which the State should protect; particularly is this true of the young pheasants. It is the habit of the young pheasant on being first alarmed to poke its head under a leaf or grass, leaving the body exposed, and the fox scents them and makes many feast on them.

N. F. UNDERWOOD, LAKE COMO, WAYNE COUNTY:

Concerning the breeding habits of red foxes would say that John F. Jaycox, a hunter and trapper of this place, killed a female fox here only a day or two ago, which contained six young ones; the usual litter is, I think, three or four. Red foxes very common; have paid bounty on thirty or forty this winter. Gray fox rare. Foxes destroy considerable considerable poultry as well as much game, pheasants, rabbits and small birds.

GEO. W. WOOD, EQUINUNK, WAYNE COUNTY:

Foxes are numerous, and very destructive to poultry. Wayne county paid in 1893 over $700 as bounty on foxes, wildcats, etc.

EMIL ULRICH, STROUDSBURG, MONROE COUNTY:

Gray foxes are most common and they steal many chickens. Consider them detrimental to a farmer, and favor bounty on them.

DR. H. D. MOORE, NEW LEXINGTON, SOMERSET COUNTY:

We have both red and gray foxes. The red fox is most destructive to poultry; he seems to be more cunning and bold than the gray fox. Both are equally destructive to game. Beneficial to farmers by destroying field mice.

DR. C. E. GOLDSBOROUGH, HUNTERSTOWN, ADAMS COUNTY:

We have red foxes common in our lowlands, and red and gray foxes equally common on the mountains. Red foxes are more destructive because larger, swifter and bolder. Both kinds are detrimental to the farmer.

Foxes, I am satisfied, do much mischief to turkeys while hatching, and with their young, and am led to this belief from having suffered on one occasion until I killed three foxes, when the trouble ceased. Weasels come next in destroying chickens.

L. T. WILT, FRANKLIN, VENANGO COUNTY:

Both red and gray; the red more abundant, hence more destructive to poultry and game. They prey on the ruffed grouse during the whole year; they are expert in taking a ruffed grouse in winter when they have plunged under the snow. The fox jumps zigzag past the hole in the snow, and as the bird raises takes him on the wing. The writer never saw a case where it would score a miss. Detrimental to the farmer, and likewise to the game interests.

GEO. K. BOAK, PINE GLEN, CENTRE COUNTY:

We introduced wild turkeys in our game preserves and the wildcats and foxes destroyed them, both old and young, regardless of efforts made to exterminate them by poison and traps. We have both red and gray foxes; they are very destructive to game and poultry in this region.

OTTO BEHR, LOPEZ, SULLIVAN COUNTY:

Have only seen red foxes in this county. Thinks they are beneficial to the farmer. They catch multitudes of grasshoppers, beetles and insects of all kinds, and lots of wood and meadow mice. My brother found a nest of young foxes not more than a week old, that had forty-two mice and squirrels in it, mostly all mice. There is occasionally a gray fox shot here, but not often.

B. F. HERRINGTON, WAYNESBURG, GREENE COUNTY:

No gray foxes; the red fox is quite numerous and is detrimental to some extent from the fact that he preys on the poultry, and has been known to carry off young pigs and lambs.

J. L. BRAUNER, EXCHANGE, MONTOUR COUNTY:

Red and gray foxes are found in our county, and both are destructive to the farmer's poultry and game.

M. E. KEMERER, WEISSPORT, CARBON COUNTY:

Foxes kill great numbers of our chickens, turkeys and ducks, and they also destroy considerable game of different kinds.

HON. A. L. MARTIN, ENON VALLEY, LAWRENCE COUNTY:

We have both red and gray foxes. They are detrimental. They annually destroy a large amount of poultry.

J. S. GAY, TERRYTOWN, BRADFORD COUNTY:

Both red and gray foxes are found with us, but the red ones are more common; both species are destructive to the farmer as they catch poultry.

A. P. BREWER, NORWICH, McKEAN COUNTY:

Foxes I consider a great benefit to farmers, as they catch a great many mice.

GEO. S. APPLEBY, DECORUM, HUNTINGDON COUNTY:

We have plenty of both, and they do much damage to poultry raisers. They also devour a great deal of game of various varieties.

PAUL SWINGLE, S. CANAAN, WAYNE COUNTY:

Foxes, both red and gray, do a large amount of damage to farmers in this region by destroying poultry.

MR. PIERSON, DYSART, CAMBRIA COUNTY:

Have red and gray foxes in quantities about equal. The foxes of Cambria county destroy more game than all the hunters. Have trailed a fox and have known him to kill and eat four pheasants in one night, and kill one rabbit and eat the head of it. Like the wild cat, foxes are hard on young pheasants, rabbits and turkeys.

B. F. BENNET, PIKE COUNTY:

Have both red and gray foxes; both detrimental to farmers. They destroy a good deal of game, particularly grouse.

THOS. SEABORNE, NEWLIN, PA.: Columbia

Foxes are perhaps the worst animals we have, destroying chickens, turkeys, ducks and geese.

C. R. NOYES, WESTPORT, PERRY COUNTY:

Foxes are destructive to poultry and game.

ARTHUR MARTIN, SANDY LAKE, MERCER COUNTY.

We have some foxes, mostly red; they destroy poultry and wild game to a considerable extent.

CHAS. HICKOX, OLIVEBURG, PA.:
We have both red and gray foxes; the red most plentiful and very detrimental to the farmer.

T. B. HOOVER, WELLSVILLE, PA.:
We have red foxes. They are considered detrimental to the poultry interests.

FRED SAXE, TAXIDERMIST AND NATURALIST, WEST PITTSTON, PA.:
We have both the red and gray foxes in our county. The red is most common, and is the most destructive to poultry and game. I consider that both kinds are detrimental to the farmer. There was a man in town that owned a fox a couple of years ago, and it got loose one night and killed four chickens in a neighbor's hen roost. Foxes will also eat eggs of chickens.

A. D. McCRACKEN, NEW LEBANON, MERCER COUNTY:
We have both the red and gray foxes; the red most numerous and destructive to game and poultry. I consider them a detriment to the farmer.

JAS. LINDSAY, UTICA, PA.:
We have both red and gray foxes here and they do considerable damage to poultry. They also destroy many kinds of small wild birds.

T. H. HARTER, BELLEFONTE, CENTRE COUNTY:
Foxes are very destructive to pheasants.

A. W. RHOADS, WILKES-BARRE, PA.:
Red foxes are common and numerous; gray foxes rare. The red fox is a great destroyer of game birds and poultry. They are highly detrimental to the farmer.

HON. G. C. BROWN, YORKHANA, YORK COUNTY:
Have known foxes to kill and eat lambs of 40 to 50 pounds weight. I have poisoned six with one lamb carcass, and all were lying dead at one time along with a hawk and three crows.

NOAH H. PARKER, McKEAN COUNTY:
Foxes are the most destructive of any animal we have here. They prey upon domestic fowls and birds of any kind whenever an opportunity presents itself.

R. W. WEHRLE, BLAIRSVILLE, INDIANA COUNTY:
Farmers in this section have told me that foxes have killed large numbers of lambs.

J. H. VAN ETTEN, MILFORD, PIKE COUNTY:
Little difference as to species. Both kinds destructive to game and poultry. One hundred and eighty of both kinds killed in year 1893 in Pike county.

JACOB B. MEIXEL, BOILING SPRINGS, CUMBERLAND COUNTY:
We have both kind of foxes in our county. The red fox does the most damage to game. I consider foxes enemies to farmers.

W. G. SARGEANT, MEADVILLE, CRAWFORD COUNTY:

Red foxes are not very abundant and occasionally a gray one is seen. I consider that they should be exterminated because they destroy our game birds, especially young grouse.

Mckean

GEO. R. BROWNELL, A. P. POPE AND W. R. PAGE, SMETHPORT, PA.:

Farmers lose many lambs by foxes each spring.

L. C. OBERLIN, SMICKSBURG, INDIANA COUNTY:

Foxes are common and destructive to poultry and game. The red are the worst. I never knew a gray to kill poultry, but still they may be detrimental.

JOS. W. KYLE, MILROY, MIFFLIN COUNTY:

Foxes are quite common and the red fox is the most numerous. They are very destructive to poultry and game. I regard them to be detrimental to the farmer.

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